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TRANSACTIONS & STUDIES
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Population Pathology[1]

By JOHN E. GORDON, M.D.[2]

CHANGE in structure or function of a cell is the primary result of action of an agent of disease on a human or other host. Further observable manifestations depend upon the number of cells involved, the ability of the agent to invade various kinds of cells, and ultimately the number of hosts attacked. As a consequence, and recognized in turn, are a pathology of a tissue or organ, as of the liver; a pathology of one or other of the great systems of the body, or of the organism as a whole, pneumonia on the one hand, plague in the latter instance; and finally the disease process as its affects populations of people, either in epidemics as for cholera, or through the steady erosion due to endemic tuberculosis, pellagra or the annual toll of traumatic accidents.

Whether it be cell, person or population, the unit of observation in large measure determines the method of study; and that holds whether the aim is diagnosis and management of the disease process, or a search for new facts about causation and course. The choice is within three general procedures.

The methods of experimental pathology, the technics of the laboratory, are the main reliance for pathology of the cell, of tissues and commonly of organs. Clinical procedure has its primary place in disease of the total organism. Given a group of people as the unit of observation the approach is through epidemiology, a discipline having to do with the physiological state of communities and with diseases of man as they affect populations of people. All three have demonstrated fields of usefulness in recognition and identification of disease; all three make use of the experimental approach in the attempt to elicit new facts. Population pathology, disease as it affects groups of people, and the epidemiologic method as used in its observation, are the present concern.

Laboratory, clinical and epidemiological methods each have their individual uses and limitations but are by no means mutually exclusive. No one of them suffices in the understanding of most disease processes. In many instances the profit has been little enough when all three are brought to bear.

Clinical study of patients in home, consultation room and hospital is clearly the point of departure. Lacking knowledge of what a disease is, the prospect of learning causative factors on which to base treatment of an individual or control in a population is essentially non-existent.

[1] James M. Anders Lecture XXXIII, College of Physicians of Philadelphia, 3 November 1954.

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The laboratory, through experimental pathology, has contributed more effectively to these fundamental matters of causation than any other of the three general methods.

The field study of disease in nature has frequently led to direct benefits when other methods have failed. More often than not, and as with clinical procedure, its greater value is to show where the problem lies. Scrub typhus was found to be of spotty distribution, mostly in low-lying coastal lands and associated with rains and wetness. It was a place disease, in that something connected with a specified area was responsible for its transmission. Mites were found regularly; experimental laboratory investigation proved them to be infective and vectors of the disease.

This complementary reinforcement of accomplishment is of everyday occurrence. Leads to new knowledge are recognized in the field; the observations are taken to laboratory and clinic for special and more intimate study; the results of these investigations go back to the field for confirmation and elaboration, for test of applicability and usefulness in a general population under ordinary conditions.

Not only do the three methods of study complement each other; they are strongly interrelated. The laboratory makes use of clinical procedure in observation of experimental animals, and in employing groups of animals becomes epidemiologic. The reliance on laboratory methods in refinement of clinical diagnosis, cause and prognosis characterizes modern medical practice. The outstanding feature of the epidemiology of today is the extent to which laboratory methods have been taken to the field. The intimate part of clinical recognition of disease in its study in nature has been stated. The principle of this interrelationship may well have been established when Robert Koch left his laboratory to apply the technics of microbiology to field study of cholera in Egypt. It has proved no less definite as field activities extended from communicable processes to other mass disease, to diabetes and heart disease and the single persisting miasm of modern times, the smog.

The several levels of observation suggest a pathology individual to each, a microscopic pathology, a clinical pathology and a population pathology; pathology being understood as having to do with those structural and functional changes which jeopardize survival of a living organism. Population pathology could perhaps be characterized as the study of the sick society, except for the common connotation of political, diplomatic, moral and social disabilities. The concern is with organic difficulties although social and biologic defect are by no means distinct; social influences are increasingly appreciated as factors in production of organic disease. The concept of a population pathology is that of mass disease based on a mass pathology; it recognizes social and biological elements; it is in direct progression from the ideas inherent in a geographical and historical pathology of other days.

Knowledge of population pathology is basic to the practice of prevention. The means is through epidemiologic analysis. Epidemiology thus is the diagnostic discipline of public health; it is also an essential adjunct of modern clinical practice, where prevention ranks with cure as a defined objective. The social medicine of today inherently rests on a group concept whereby an association of persons acts in determining disease of the group or of individuals within the group. The technics of group study, the epidemiologic method, are recognized (25) by medical educators as the underlying discipline guiding its practice. What comprises a population and the nature of the epidemiologic method now have brief attention.

A population theoretically consists of two or more persons. Practically the basic unit of observation is the family, all persons resident within a prescribed household. Families themselves are grouped to comprise neighborhoods, towns, rural districts or counties. Sometimes cities and nations and occasionally the world population form the units of observation. Whatever the size, a population is to be understood as something more than a collection of individuals. By reason of common association,

individuals interact with one another to give a unit with an individuality potentially as great as that of a person. Philadelphia is not Pittsburgh and Pittsburgh differs materially from New Orleans. These interactions have specific relationships to disease, clearly in respect to spread of infection and also through social effects which bear strongly on the etiology of numerous other mass diseases. Spacing of individual family units in relation to others, and the degree of crowding within the family itself, are other factors that determine frequency of disease. These features arise from the group association. The pattern varies with constitutional factors of a genetic or ethnic origin. Associated habits, taboos and cultural differences have a profound effect on mass mental disorders and more on physical disabilities of populations than is commonly appreciated. To take a population as the unit of observation is reality and rather far removed from an artificial distinction.

There are practical reasons for a separation of interests between disease of the individual and disease of populations. Many morbid processes have distinct and sometimes opposite significance when related to persons as contrasted to populations. Rabies is of extreme concern to the affected individual; death is inevitable. In terms of a nation, it is of little moment; the few deaths make no impression even on the last decimal ordinarily marking the death rate for that society. The common cold on the other hand may be a disagreeable interlude but is scarcely of material concern to the individual patient. For populations however, it outranks all other diseases as a cause of disability.

Many diseases exist in mild, atypical, inapparent and unrecognized form in addition to the classical manifestation that leads patients to consult a physician. That circumstance commonly provides the primary means by which an infectious disease is maintained in a population, diphtheritic infection as contrasted to the disease diphtheria, carriers versus cases. Such immature manifestations of disease often mark the beginning of chronic degenerative processes. Similarly, ionizing radiation of origin in the atomic bomb produces limited numbers of well defined after-effects, leukemia and cataract. Incomplete evidence suggests that lesser and even minimal dosage gives a result below the level of ordinary immediate clinical observation, but affecting numbers and with an ultimate effect which is more far-reaching than the apparent clinical entity.

Collectively such instances are comparable to an iceberg, one-tenth visible and evident, nine-tenths submerged and hidden but no less real. The identification of total population effect requires that they be recognized and measured in terms of frequency and ultimate progression. The means is by field investigation, aided by laboratory procedures; by their nature they do not come within the range of clinical activities. Presumably they contribute to the unexplained portion of many long term illnesses, and they relate to a variety of agents of disease.

THE EPIDEMIOLOGIC METHOD

Mass disease is here interpreted as the resultant of biologic forces exerted by a host—in this instance a population of people—and by the environment in which that host lives. This is a concept based on the principles of ecology, and comes through an evolution of ideas (47) that dates from the time disease as a mass phenomenon first engaged the attention of man; it was first formalized in terms of medical ecology by Sheldon Dudley (13). With disease and injury interpreted as problems of ecology, then behavior qualitatively and quantitatively is dependent upon the kind of balance, the state of biologic equilibrium currently existing between a living organism and its environment. This is furthermore a state that varies materially from time to time and under a variety of circumstances.

Recognition of multiple factors in causation is inherent to an ecologic interpretation of mass disease. The simpler complex of an opposed host and environment is enlarged to advantage by separating specific agents of disease, as a group, from the total of environ-

ment. The concept of causation is thus brought in line with modern medical attitudes in classification of disease, which is according to agent. Mass disease is thus looked upon as the interaction of a triad, the members of which are a host, with man the primary concern, an agent of disease, and lastly the intricate complex of environment. In any particular situation the three have a relative and varying weight in causation as do the individual elements within each. This requires quantitation, whereby independent variables are isolated from the dependent and observed in relation to the total effect. Since etiology as a principle applies to all disease, this pattern of ecologic analysis should hold for all mass disease of human beings, whatever its origin, course and extent (18c).

The epidemiologic method is understood as the use of these principles in analysis of mass disease. It is of course nothing more than the scientific method applied to a particular purpose, the study of health and disease in groups of people. The basic scheme involves in order a definition of the nature and extent of the problem; a search for features of causation of the disease and of disease distributions, through study in nature of affected and unaffected fractions of the population at risk; the formulation of principles for a program of control based on demonstrated cause and directed towards limitation of death, defect and disability; and finally field and statistical evaluation of the results derived from control measures.

Methodology in epidemiologic procedure has advanced progressively. The original restricted concern with epidemics was an emergency epidemiology, the main objective to put out the fire, often empiric in its methods and practiced with or without facts. With recognition of the infected individual and his family contacts as the practical unit for investigation, procedure was refined. Analysis of epidemics became the accumulation of such units and their established relation one to another. Epidemiologic case study proved of equal usefulness in endemic circumstances, as a means for limiting incipient epidemics.

The field survey of whole populations, designed to determine prevalence of a particular disease or total disease frequency at a particular time, eventually was added to these retrospective or proband methods, which start with a known focus of disease and an aim to retrace lines of transmission and identify the point of origin. For the infectious diseases, the lesser frequency and moment of epidemics made this development possible; it was essential in the increasing application of epidemiologic method to mass injury and to mass disease of noninfective nature, where the endemic state prevails and epidemics are less frequent.

A more recent development may be called the field review, for it is based on incidence in contrast to prevalence. Long-term prospective observation of populations, periodic and continued, is directed toward determining origin and course of diseases of slow evolution, typically the chronic degenerative and neoplastic diseases. The cost and effort are excessive. Some such studies are designed to extend over a generation, but no other procedure gives promise of the desired information.

EPIDEMIOLOGIC METHOD APPLIED

The epidemiologic method still is best known as a technical procedure of the professional public health worker applied to the control of epidemics. It has outgrown that limited usefulness, and furthermore now serves physicians of many interests to a variety of purposes, the medical investigator, the private physician and others.

With the end of the great epidemics a century or so ago (47) public health found opportunity to turn the technics of field investigation to an endemiology of infectious processes, in appreciation that the ordinary behavior of communicable disease was as important in control as the immoderate epidemic. The development of a natural history of chronic noninfectious diseases and also of mass injury was in logical progression.

The interests that developed in cancer, diabetes and heart disease brought allied uses of epidemiologic procedures in projection of disease incidence toward a practical objective of present and future needs in hospital beds for tuberculosis and cancer. Controlled field studies eventually became the accepted means by which to determine the practicability of such specific public health measures as an immunizing agent against whooping cough (6); the individual clinical test does not suffice.

Public health advanced significantly towards a more statesmanlike and scientific practice with general recognition that a program for control, whatever the nature or purpose, requires a final evaluation of accomplishment. The index is through comparison of the situation before the program is introduced with that which follows; the method is epidemiologic.

Almost no individual illness fails of impact on persons who surround the patient, with the result that a practice of preventive as well as curative measures is characteristic of modern medicine. The family as a consequence becomes the unit of observation and the attending physician knowingly or inadvertently practices small group epidemiology. The principle is the same as for the larger population group of city or even nation. The doctrine of social medicine rests on that approach, for there is no social medicine without interaction of individuals and a group effect. Other applications to medical practice are more concrete.

Epidemiologic analysis of groups of cases is fast taking the place of the standard case report and the less tangible clinical impression in directing medical opinion. New drugs and diagnostic procedures are subjected to the rigorous test of trial with matched controls and in numbers sufficient to give statistical significance; and likewise various features of clinical course and behavior. The boundaries of clinical recognition, so indefinite in the single instance, are now being extended by use of these technics in a better definition of precancerous and prediabetic states and the consequent opportunity for an improved preventive medicine.

The medical literature of the day demonstrates the extent to which the results of laboratory research are evaluated by epidemiologic method in terms of clinical usefulness.

ALTERED RELATIONSHIPS AMONG MASS DISEASES OF MAN

The changes that have taken place in the social and economic structure of the world during the past one hundred years have had a fundamental effect on existing attitudes in epidemiology. Epidemiologists are called upon to re-examine the scope of interests to be included within that field and to assess anew the place of epidemiology in relation to medical practice.

The mass disease problems that affect communities have altered notably within a century. Some diseases now have far less significance than formerly; others have come from an inconsequential position to rank among leading causes of death or as major factors in lost efficiency or disabling illness. What has happened, however, is more than difference in relative numbers of persons involved. In many instances, the nature and character of a mass disease have changed. Less often, new disease conditions have been introduced by reason of the shifting ecologic state.

In 1900 the ten leading causes of death in the United States included five infectious diseases (*Fig.* 1). The current list has only two. First place in 1900 was occupied by an infectious disease; by 1952 the highest rank of a communicable process was sixth, for pneumonia of all forms. Tuberculosis, the other infectious disease, barely made the list.

The community problems of the present, as measured in terms of deaths, are of diseases not communicable nor caused by a specific infectious agent. They include heart disease, the neoplasms and diabetes; and also mass injuries as distinguished from mass disease. The result is much the same when the criteria in measurement are defect and disability. Although no

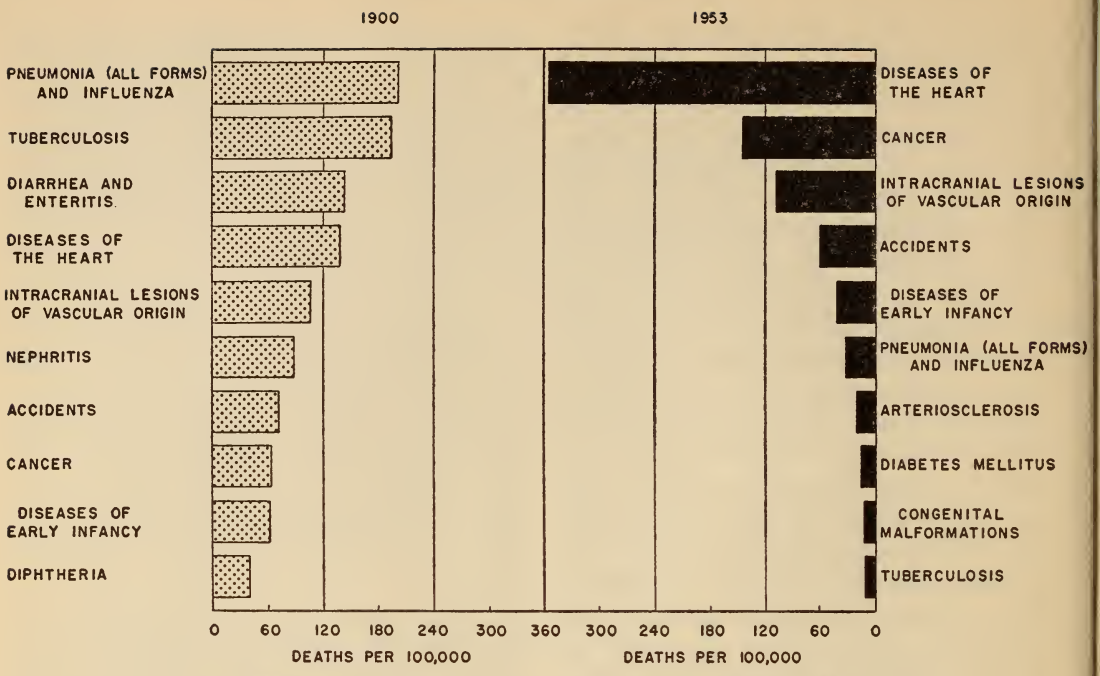

FIG. 1. TEN LEADING CAUSES OF DEATH IN THE UNITED STATES, 1900 AND 1953
Source: Vital Statistics of the United States

disease has supplanted the common cold as a factor in disabling illness, nutritional deficiencies and mental disorder have high rank.

The development of new knowledge or the introduction of new conditions ordinarily demands a change in methods and a shift in emphasis. Evidence exists that the world tends to become one epidemiologic universe, that it is experiencing an aging of its population, and that the social and economic environment has experienced marked alteration. This has resulted in changed values among mass disease problems. Epidemiology, conceived as a general biologic discipline applicable to all diseases where groups of persons and things are involved, has moved into new interests. The field worker has assumed new obligations.

COMMUNICABLE DISEASE

A modern perspective of epidemiology recognizes that in many parts of the world, and in countries accounting for the bulk of world population, the infections have first rank, with every indication that they will so continue for a long time. In the Western world they have relatively less significance than 50 years ago. Other mass diseases have gained stature, to an extent warranting partial diversion of resources toward their study and limitation.

There are many reasons for a continuing and sound concern of infectious processes. Tuberculosis and pneumonia are outstanding causes of death. Many other infections are far from control, to say nothing of the eradication that some so optimistically seek. Unsolved problems exist in plenty. Outbreaks are frequent and epidemics endure. Furthermore, the infectious diseases continue as "the place to learn the trade of epidemiology," for more is known of their behavior than for any other class. The choice now taken arbitrarily to turn to some of the newer interests in epidemiology implies no lack of appreciation of the infections among mass diseases.

ACCIDENTAL TRAUMATIC INJURY

The application of preventive measures to accidental injury has lagged behind attention to disease. When "the care of the sick and injured" was enlarged to include preventive

activities, injuries were neglected. The main reason was a prevailing belief that they were due to nothing more than bad luck. That accidents have causes as definable as for many diseases and therefore are amenable to practical limitation, was not recognized; insufficient information was at hand upon which to build a program for prevention.

The epidemiologist is readily attracted to accidents. They are acute conditions, like the communicable diseases; they even occur in epidemics and are associated with seasonal, age and sex, occupational and all manner of other influences manifested by mass disease (18a).

A study was undertaken to determine by epidemiologic analysis the features of accident prevention that warranted special consideration in Massachusetts (36). Accidents ranked fourth among causes of death in both Massachusetts and in the United States, compared with sixth position in 1935. The state had a measurably lower rate than the country as a whole; since 1923 Massachusetts has had a lower motor-vehicle accident rate than the United States generally; the record for accidental deaths in industry was also better than average. With accidents divided into classes by place of occurrence, it developed that accidents in public places (non-motor vehicle) accounted for a larger proportion of accidental deaths in Massachusetts than in the United States as a whole; and rates for home accidents put Massachusetts in the poorer group of states. Falls were identified as the primary factor, with only one state exceeding Massachusetts in accidental deaths from this cause. Severe falls are a function of age and Massachusetts has an older population, in part accounting for the fact that in 1946 falls were responsible for 26 percent of all accidental deaths in the United States, and 44 percent in Massachusetts. Falls among aged persons were clearly defined as the place to direct preventive efforts.

The initial proband approach through investigation of fatal accidents is now being enlarged through the prospective methods of field survey and field review. Total populations are the unit of observation. Both fatal and non-fatal accidents are determined, also the frequency of accident situations as well as of the events themselves. Home accidents receive the particular attention of health authorities as the social agency best suited to their control (32), but motor vehicle accidents also are being studied by these newer methods (5).

CANCER

Cancer was one of the earliest epidemiologic interests among non-infective diseases (43). Current effort is mainly toward description of the kinds of people who do and do not develop the disease, to the end of applying such cancer control methods as exist (31), chiefly early recognition and clinical management of patients. The classical example is that from Sir Percival Pott, who observed that most of his patients with cancer of the scrotum were chimney sweeps, thereby establishing the association between soot and scrotal epithelioma. Such occupational influences largely dominate epidemiological activities, but a broader ecologic approach is seen in studies of geographical distribution of cancer of skin and other sites (26), and a search for the causative factors involved.

Methods of study (16) are either indirect through proband cases, or by direct measure of frequency of the disease in a population. The proband method obtains retrospective histories of patients with cancer and of a selected and matched group of persons without cancer. The method is useful, but gives no specific information about incidence of cancer in the population at risk; patients commonly are not representative of the population from which they are drawn. Cancer of the lung and its association with smoking is cited in illustration.

The principal epidemiological studies of lung cancer to date are based on study of proband cases (12), with demonstration that the greater percent of patients with this form of cancer are heavier cigarette smokers and have smoked for a longer time than persons without lung cancer. The direct method is being used by the United States Public Health Service and the Veterans

Administration to determine incidence of pulmonary cancer in a defined population at risk. Smoking histories are being procured from 300,000 veterans of World War I who carry government life insurance. Since deaths in this group now approximate 4,000 to 5,000 each year, a reliable incidence of lung cancer presumably can be determined, along with a relation to history of smoking.

Definitive methodology is applicable to cancer only where a specific agent or complex is known, thus providing conditions comparable to recognized infectious agents in communicable disease. In certain investigations the epidemiological approach is toward determining agent or suspect material, for example, identification of carcinogens in chromates, aniline dyes, cigarette smoke (22). For the rest and indeed the bulk of cancer, this specific relationship of host, agent and environment has not been ascertained and activities continue more or less restricted to description of characteristics of population groups who do and do not develop cancer.

The various environmental factors to which a general population is exposed have gained significance in causal relationship, of which examples have been cited. Persons living in a sheltered environment where life is well regulated and differs from that of the general population, conceivably may have an incidence of cancer that is different. Studies are now under way (42) to determine incidence of cancer and distribution of cancer by sites among nuns in Catholic religious orders.

DIABETES

Diabetes is a chronic disease for which no specific agent is known. The search for causative factors in this or any other mass disease is not inhibited because the agent is not in hand; if anything investigation of factors inherent in host and environment is more strongly indicated. Case study of affected individuals has established that about half of cases occur between 40 and 60 years. The relative severity and atypical clinical course of diabetes in younger people compared with middle-aged and old, suggests a multiplicity of causes. Jews as a group have been historically associated with a high incidence of diabetes, but a small field survey did not bear this out.

A search among physical characteristics of individual patients demonstrated that diabetes is certainly not distributed in random fashion between the fat and the lean. Obesity appears to be an important predisposing factor; one half of adult diabetics were at one time or another at least 20 percent overweight. Much remains to be done in defining the basic physiologic relation between obesity and diabetes, particularly through epidemiologic and laboratory procedures in supplement to existing information so largely of clinical origin.

The increased susceptibility of individuals with a family history of diabetes suggests a strong hereditary factor, as defined by genetic analysis and by family study (34).

Recent evidence suggests that women destined to develop diabetes often suffer temporary defect of carbohydrate metabolism during pregnancy. If untreated, the condition frequently results in fetal loss, and somewhat less definitely in fetal damage predisposing the child to diabetes. The subject is under investigation epidemiologically, and clinically through insulin treatment of such persons during pregnancy in an attempt to prevent diabetes in mother and child.

Environmental factors as a determinant of diabetes are less well defined. However, wide geographic variations in diabetes mortality have been established in America; highest rates are in the northeast and lowest in the south and west. Death rates are higher in cities than in rural areas.

One community in Massachusetts (45) has been studied by field survey and now by field review to describe the course of diabetes in a group of people. The original survey gave a prevalence of about 1.7 percent, with some half of the cases previously unrecognized. Some few had findings suggestive of diabetes but unconfirmed. In subsequent re-survey, cases with borderline laboratory findings at the first examination were firmly established as

having then a high incidence of diabetes. Currently, comparison is being made of physical characteristics of patients, of borderline cases, and of controls. The behavior of diabetes in one community of 5,000 population should be better understood as this study is completed.

CONGENITAL ANOMALIES

The indications for applying the epidemiologic method to problems of congenital defect were inherent in the original observations of Jonathan Hutchinson on the congenital stigmas of syphilis; an actual urgency to do this was revealed when Gregg demonstrated the teratogenic effect of rubella in pregnancy. The determining importance of conceptual age of the embryo and fetus emphasized in 1947 (23) may be shown to operate throughout prenatal life and at the earliest moments after premature birth.

Probably the most striking epidemiologic fact unearthed about any of the congenital defects is the relation of mongolism to advanced maternal age, an observation also the longest established. The risk of producing a mongoloid child increases with age about 50 fold, from around 0.3 per 1,000 pregnancies at age 20–30 to around 15 in the fifth decade. A beginning control of this life-long defect of the central nervous system is to be expected only when these epidemiologic facts can be interpreted, expanded and given meaning. What are the factors associated with aging of mothers which synchronize to maim the differentiating brain, heart, eyes and little finger? Are they endocrine, gynecologic, systemic or combined? The answer to such questions which are biologic, not statistical, is the crux of the problem of control.

Geographic studies of mongolism have never been done on anything more than a tentative and inadequate basis, nor have secular occurrences or changes in maternal age distribution in different countries and at differing times been plotted.

Epidemiological studies are currently in course at a number of centers, designed to analyze the relation of mongolism to maternal aging. The relation itself suggests that chronic rather than acute processes are involved. A definite excess of chronic conditions—heart and kidney disease, gynecologic disturbances and anemias—has been observed in 50 pregnancies of older mothers productive of mongoloid babies compared with 50 other pregnancies selected as controls, mothers being matched for age. The two groups are being compared according to various maternal attributes, for mongolism is interpreted as due to one of several non-specific stresses active in the first trimester of pregnancy.

The condition of retrolental fibroplasia (24) further exemplifies how epidemiologic methodology may be fruitfully applied to the solution of an unknown disease, with the differentiating retina the susceptible tissue and the newborn fetus the susceptible host.

NUTRITION

Field study has perhaps reached a higher level of development in nutritional disorders than in any other class of mass diseases, excluding infections. The work of Goldberger on pellagra in 1916 (17) stands with that of Snow, Budd and Panum among classical field studies. Wading through the wilderness of conflicting theories and the mud of the mill villages of South Carolina, Goldberger found his data in the homes of persons affected, and proved conclusively that the disease was due to defect in the diet consumed. His ideas were enlarged to include the potentiality of a protein deficiency as well as a vitamin, both currently recognized as interlocking factors of causation in pellagra.

The American concern with obesity is a never ending source of bewilderment to foreign students coming to Boston. The problem is not exactly world wide, but the increasing interest in chronic degenerative diseases has established important relationships. My colleague Jean Mayer (29) has recently brought the facts together in a summary of the community problem. He sets down factors relating to the triad of host, agent and environment, which in obesity include heredity, bodily or mental injury, and various features of the ecologic en-

vironment such as food supply, temperature, exercise, physical activity, and cultural mores. An interaction of multiple causative factors is seen in explanation of the broader community reaction.

A casual acquaintance with Asia and Africa suffices to sharpen appreciation of protein malnutrition as a global problem. Within the past decade a condition known as kwashiorkor has emerged into world medical literature, largely as the result of field surveys by Brock and Autret (7) for the World Health Organization and the Food and Agricultural Organization of the United Nations. Kwashiorkor has been established as the extreme degree of protein malnutrition in a biologic gradient (18b) that extends from the mildest forms with little or no clinical manifestations through intermediates with known and as yet unknown features. Protein deficiency is thus being fitted into a pattern analogous to that of poliomyelitis and diphtheria, far reaching in the numbers of people it involves and with all manner of variation in the impress upon populations of people. The community studies are in the best tradition of field epidemiology.

OTHER NON-INFECTIOUS MASS DISEASE

The continued cataloguing of contemporary interests in field study is beyond this brief summary. Some few are named: (1) The Framingham Heart Study (10), now four years under way in a projected investigation to extend 20 years, an outstanding example of those long continued observations which appear the necessary procedure in mass disease of degenerative and neoplastic nature; (2) Smog, (30), of increasing consideration with greater industrialization, in Europe (35) and in this country (39); (3) Chemical intoxications, not alone in industry but in general populations, so well brought out by Baltimore observations on lead poisoning (46) but dating back to the Devonshire colic (4); (4) Dental abnormalities in which Trendley Dean (11) has taken the lead, with community studies (1, 37) now centering on fluoridation in relation to dental caries.

The emphasis thus far has been on planned investigations directed toward fundamental knowledge about selected mass disease, always of course with the aim of ultimate use in a better program for prevention. It remains now to speak of certain general fields of interest in investigative epidemiology.

GEOGRAPHIC PATHOLOGY

For the greater part of the nineteenth century the dominant approach to epidemiology was through geographical and historical pathology. The potentiality was greatly enlarged through the field method of study that came into play in the last half of the century The full value of geographic pathology might have been attained with the coming of microbiologic methods, except that the study of disease was then to a large extent lost to view in the newer enthusiasm for the study of the agents that cause them.

With the twentieth century, medical geography came close to being a lost art. World War II demonstrated the usefulness and the necessity of this sort of information. An Atlas of Disease (48) was prepared in Germany under military auspices, and a comprehensive geography of disease and sanitation (40) in the United States. The actual mapping (28) of numerous outstanding diseases was a consequence of growing international attitudes, and realization that few diseases are really known when judgment rests on experience within a circumscribed region.

The development of facilities for scientific investigation and increasing numbers of trained men in tropical countries have produced an imposing information on specific features of mass disease in warm climates. Problems indigenous to the tropics become a matter of general investigation as the world tends to become a single epidemiologic universe, with military and political considerations adding incentive. Other than for the little book of Edge (14), I know of no attempt however to bring these things together in a geographic pathology of the tropics. What was known in the days of Hirsch (21) and others, centered

largely in Western Europe and to an extent in America. The epidemiology of helminthic and protozoal disease is still too much restricted to life cycles of parasites and regional distributions, although malaria is excelled by few other diseases in the completeness of its epidemiologic description. The problem of accidents in less well developed countries is unexplored; what is known of cancer as a community disease is clearly not transferable from the Western world on which it is based, to countries of the tropics.

The variations in mass disease occasioned by arctic or cold weather environment have scarcely passed the speculative level. These regions become important with expanding commerce, the need for more land, their mineral resources and militarily. The behavior of the simplest diseases is unknown, for example the relative place of contact and vehicle transmission in intestinal infections. Because the tropics are the foreign environment best known, an unwarranted tendency exists to transfer the knowledge there obtained to interpretation of this other strange environment. Such work in arctic epidemiology as has been done is largely under simulated conditions of the laboratory. The call is for field work, again the study of disease in its natural environment; comprehensive investigations are now underway (2); pioneering in epidemiology is still possible.

EXPERIMENTAL EPIDEMIOLOGY

An attempt to define the general laws and principles of mass disease by experimental means through colonies of animals was a logical step in the transition that science experienced generally, as it progressed from descriptive and comparative method to experiment. The ground work was by Greenwood, Hill, Topley and Wilson (20). Webster (44), Schneider (38) and others in America contributed, and most recently Fenner (15a, b) in Australia. Burnet's (8) observations on myxomatosis of rabbits revived the methods of Theobald Smith (41) in studying natural disease in animal populations. Dingle and his group (3) in Cleveland have brought an innovation to methodology through substituting human populations for animals. The natural entrance of acute infection into the human herd is recorded with the course, behavior and subsequent result measured by periodic examinations.

AN EPIDEMIOLOGY OF HEALTH

Both health and disease of man are interpreted as the resultants of an ecologic process. It is therefore singular that in applying epidemiologic methods to analysis of practical problems, the events or things selected for study have been so regularly disease or injury. This has held throughout the history of epidemiology, despite the broader scope of epidemiologic interests in recent years. The word epidemiology, signifying "upon the people" and referring to occurrences that affect man in the collective sense, can reasonably include events that are either favorable or unfavorable, hence both health and disease. The concept of an epidemiology of health has been set forth in a recent publication of the New York Academy of Medicine (18d), with illustrations of study and practice under a variety of conditions.

The knowledge essential to practical use of an epidemiology of health may well be forthcoming in the many surveys of whole populations now so much a feature of epidemiologic practice (33). Investigation has turned also to several specific items such as maternal age (27) and premature birth (9) as determinants of community health.

Still more recently, controlled field studies have been initiated on a long term basis, to determine by direct observation the potentialities of controlling overpopulation, specifically in a province of North India (19). The advances made by public health in lowering death rates have had an effect that now demands equally serious attention to birth rates. A further objective is to determine what effect successfully induced control may have on the economic and social status of a population, a consideration universally assumed to be favorable but never proved, much less quantitated under controlled

conditions. Cheap, simple, safe and reversible methods of contraception are known. Clinical trial has been adequate to demonstrate usefulness. What may be expected when applied to whole populations has yet to be determined. The critical issues are the biologic efficiency of the several methods when used outside the ordered conditions of laboratory and modern medical clinic; and secondly the acceptability to a particular population. The study is epidemiology in an attractive aspect, for causative factors are both biological and social, methods of study involve both disciplines, and measurements are in similar dual terms. With judgment based on exigency and the welfare of a total world, the problem of population dynamics is surpassed by few.

SUMMARY

Population pathology has been presented as one of three broad approaches to an understanding of disease in man; populations of people rank with those other basic units of observation which are cell and tissue in microscopic pathology, the organism as a whole in clinical pathology. Epidemiology stands in relation to population pathology as a method of study rather than an independent body of knowledge.

The epidemiological method has three main uses: as a research procedure in determining cause and behavior of mass disease of populations; as the diagnostic discipline of public health, directing operational procedure in the control of community disease; and as the basic discipline governing practice of social medicine by clinicians. Social and preventive medicine, by the concept which brings them existence, have to do with groups of people; epidemiology is the means for understanding such group relationships as they act in health and disease.

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Combat Psychiatry and Civilian Medical Practice[1]

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THIS presentation proposes the feasibility of applying the principles and methods of combat psychiatry to the problems of civilian medical practice. At first glance the deprivations and hazards of battle have little in common with the comforts and security of civil life. But upon further reflection it becomes apparent that adaptation in a peacetime setting is also a struggle in which the individual either alone or as a group member competes with others for the same objectives. During this conflict most civilians suffer from a relative lack of food, shelter, clothing, recreational opportunities, social outlets, and many other day to day wants regarded as necessities which, when considered with the better facilities and more ample supplies obviously available, appear as deprivations or hardships comparable in feeling to those endured by the combat soldier. Both peace and war contain similar seemingly endless periods of waiting for events to occur during which the involved person is powerless to act. Military discipline, regimentation, and obedience to the command of others higher in rank has its civilian counterpart in the more subtle but nonetheless inexorable authoritarian pressures of parents, teachers, employers, marital partners, and the laws and mores of community and society. While battle poses immediate threats to survival, the preservation of life is also of major concern in a civilian existence where disease and injury lurk as an ever present realistic possibility and, as in combat, death becomes more and more a mathematical inevitability with continued success in remaining alive.

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It might be argued that the tensions and terror of battle permit none of the pleasures obtainable in civil life from interpersonal relationships and prestige accomplishments. However, combat also evokes enduring and gratifying emotional bonds between persons who share common hardships and fight together, and insofar as achievement is concerned, where else but in battle can recognition and status among one's fellowmen be obtained so quickly and with so little formal training or intensive preparation.

From the foregoing it is evident that the same basic needs, goals, and frustrations which govern human behavior are present in both peace and war. Differences in adaptation to these two contrasting environments are mainly due to the rapidity with which external situations confront the individual. A time dimension must therefore be considered as the pertinent element in understanding the adjustment of individuals in battle instead of qualitative differences in behavioral mechanisms. In combat there is a telescoping of events within a brief period which exerts an increased demand upon the adaptive resources of the individual. The slower and more unconscious physiological and psychological processes usually sufficient for civilian adjustment are necessarily accelerated in order to cope with the abrupt environmental changes of battle. Because the adaptive mechanisms used during peacetime are magnified and become overtly demonstrable by the quickening tempo of combat, it is believed that wartime observations of behavioral difficulties and disease contain information that can be utilized for similar problems that confront the physician in civilian general practice.

The most revealing insight gained by experience with illness and behavioral abnor-

malities under battle conditions concerns a more comprehensive appreciation of their causation. Since the slower and more subtle processes of peacetime adjustment permit little awareness of the complex social, interpersonal, and homeostatic mechanisms involved in the maintenance of well-being, physicians are prone to utilize the traditional medical approach of a lineal time-space cause and effect system (1) and consider disease and emotional disorders the result of some preceding traumatic event or series of events. This viewpoint, bolstered by the indoctrination of physicians in the physical sciences and further secured by the conspicuous success of medical research in uncovering many extrinsic and intrinsic sources associated with various disease syndromes, has influenced practitioners to search diligently for specific etiological agents or circumstances to explain the symptoms or impaired functions of their patients. In time, this approach has been communicated to the laity who, as patients, often helpfully attempt to aid their physician by citing this or that recent or remote happenstance that seemingly has some logical causal relationship to their complaints. Psychiatry has also accepted much of this apparent scientific doctrine and at various times emphasis has been placed upon such causes for adult mental aberrations as parental neglect in the early formative years, sexual difficulties, frustration of dependency needs, repressed hostility, and other unconscious complexes and internal conflicts.

While the above concept of linear causation is operationally useful in many patients hospitalized for severe illness where it is imperative to institute action against the most immediate threat to life, it is less helpful in the ambulatory patients who mainly concern the physician in general practice. Here the problem of causation is quite vexing for in more than half of these patients no clear-cut etiology can be demonstrated, nor can their complaints or symptoms be explained by any simplified cause and effect reasoning. Because of the foregoing difficulties it has been recognized that the traditional medical viewpoint represented a relatively narrow approach toward illness and in recent years a new concept termed "psychosomatic" has arisen, which views disease as a total reaction of the individual that includes the inter-relationship of the resources of both psyche and soma operating together as a unity.

Observation of the more overt physiological and psychological mechanisms displayed in combat fully confirms the basic tenets of the psychosomatic concept but goes beyond mind-body relationships, for behavior and illness are seen as a complex resultant of many simultaneous and changing forces, that originate from within and outside the individual, some of which support effective or constructive activity while others tend to disorganize and produce non-effective function, including disease. Social forces must be included in any formulation of adaptation since in the combat setting it becomes apparent that individuals rarely function alone but almost always operate as a more or less integrated member of the group. In essence, combat clearly demonstrates that the phenomena of illness and non-effective behavior must be considered with respect to the field in which they take place. Viewed in this light, casualties of all types represent an end result of a concatenation of circumstances in which there is persistent failure of the supportive forces to sustain the individual against the opposing pressures of functional disorganization. This dynamic field theory (2) has considerable operational advantages over the rather static linear cause and effect viewpoint for it permits an examination of the various constructive and destructive elements of adjustment and thus provides a practical approach to the problems of prevention and treatment.

The benefits of such a field concept can best be illustrated by considering the causation of combat exhaustion, the usual psychiatric casualty of battle. Here multiple and simultaneous forces are responsible for breakdown, one of the most important of which is the fear or anxiety associated with the dangers of battle. Psychiatric casualties generally follow

exposure to combat conditions and are increased by intense battle episodes in which there are heavy losses in killed and wounded. Victims of combat exhaustion verbalize fearful experiences as the cause of their difficulties or manifest the disorganizing effects of fear by uncontrollable trembling, sympathetic overactivity, startle reaction to innocuous stimuli, hysterical syndromes, and personality disruption. Seemingly they have received an overdose of fear for its noxious effects pervade body and mind. However, despite the crippling action of fear, most combat participants not only function effectively, but many exhibit outstanding feats of bravery and courage. Moreover, there are marked differences in the frequency of psychiatric casualties from various combat units subjected to similar battle stress (3). Vulnerability to psychiatric breakdown varies from person to person as well as in the same individual, depending upon the different circumstances of the combat situation. Obviously the adverse effects of fear can be successfully opposed or enhanced by other elements of the battle situation.

Since it is a common observation that persons differ widely in their capacity to tolerate or control fear, it is reasonable to expect individual personality to be a pertinent influence in any field concept of behavior in combat. For example, the character trait of passivity is a distinct handicap in adapting to battle because such an individual has difficulty in exhibiting or externalizing hostile activity. The same warning signal of fear that grips the mind also presses the bodily mechanisms for action. Action drains tension whereas inaction fosters the damming back and build-up of disorganizing fear sensations. This is exemplified by the many occasions in combat when external activity is inappropriate or impractical. The increase of painful tension produced by such an immobilized state under fire and its somatic accompaniments are well known to combat personnel whose expression "sweating it out" is an apt description of such an experience. Even speech is helpful in battle, but aggressive action as in firing and movement gives the greatest relief from combat tension. The timid, helpless, passive person is thus unable to utilize fully one of the best antidotes to the poison of fear.

Another personality facet that bears upon combat adjustment is the self-critical faculty or conscience. This internalized representation of society forces the individual to perform uncomfortable or hazardous duty by the counter-anxiety threat of guilt. In combat, conscience may serve as a powerful influence upon the soldier to control fear and remain effective lest he suffer the pain of self-condemnation. Individuals with weak or permissive self-critical faculties have less resistance in permitting themselves to utilize manifestations of combat failure. Persons with a harsh or overly strict conscience may have an added burden of tension in battle because they often suffer from a fear of exhibiting fear. A third personality trait relevant to combat adaptation is seclusiveness as characterized by solitary habits of work and recreation, a seeming inability or lack of desire for friends or other interpersonal relationships, and in general a lonely pattern of existence. Such individuals do not allow themselves to be integrated in the group and therefore receive little emotional support from buddies and comrades. In effect they are alone with their fears.

The foregoing discussion of personality components should not convey an impression that they play a fixed or static role in combat adjustment. Passivity, conscience deviations, and seclusiveness are relatively common characteristics that in actual practice can be altered by buddies, leaders, and other circumstances of combat to be described later. It is only when such traits are present in individuals to a marked degree that change to a more effective adaptation is most difficult.

Of obvious importance in adapting to combat is the physical status of the persons involved. Weakness in the somatic sphere lessens the capacity for aggressive activity. The soldier with diminished physical powers is like the severely passive individual who can only absorb fear. Such a state also decreases

one's ability to contain or tolerate tension. It has been repeatedly demonstrated that undue fatigue, deprivation of food and water, and lack of sleep, when continued, produce a marked increase of psychiatric casualties. The bodily tension which inevitably accompanies participation in combat adds a further source of fatigue to the physical stresses inherent under battle conditions. For these reasons troops cannot fight indefinitely but must be placed in reserve positions at periodic intervals for rest and recuperation. Intercurrent illnesses such as diarrhea, low grade fevers of various types, malaria, and infectious hepatitis, that are masked by the usual discomforts of men in battle, cause similar lowering of physiological capacity and a subsequent breakdown in the defense against fear. Not infrequently such cases are evacuated as combat exhaustion casualties because of symptoms that indicate disabling tension.

Another pertinent determinant of adaptation in battle is the influence of prior training. A realistic training program enhances physical stamina and prepares the soldier to withstand better the strain of fatigue and other physical vicissitudes. But even more important, training provides the technical information, practice, and confidence in the use of weapons which make possible the employment of appropriate aggressive action in combat. Despite these advantages, newcomers to battle have an increased incidence of combat failure. This is especially true if new units or replacements are suddenly thrust into severe combat. This greater vulnerability of new troops is due to inexperience and the fact that time is required for the formation of group unity and cohesiveness.

Perhaps the most effective force that sustains men in combat is derived from the emotional support and actual protection given by buddies and other members of the combat unit. This phenomenon, termed group unity or group identification, spontaneously arises as an adaptive mechanism by two or more persons faced with a common menace. Nowhere is there a greater need for such an alliance as in battle where men move toward each other figuratively and literally in what might be described as an "instinctive" huddling process. With survival and success in battle, strong friendships are rapidly formed and exert a profound influence upon personality and behavior. Conscience faculties are reinforced to include the standards held by the combat group. The individual is compelled to abandon selfish desires or else not only suffer self-condemnation but risk losing the support and respect of his fellows. Even the poorly motivated combat participant is literally forced to accept the prevailing mores of his unit since the battlefield is hardly a place to be left alone. The passive person is also influenced by group identification to adopt aggressive patterns of behavior which not only decrease his discomfort by the discharge of tension but is rewarded by group approval. The combat situation aids in overcoming seclusive character traits for the sharing of common hardships and dangers, close contact, and dependence upon others, provides the most favorable conditions for the development of interpersonal relationships. It is thus evident that group identification is an integrative process in which individual needs are given up in favor of group welfare. In return the group member receives protection and emotional warmth and thus a greater resistance to the disorganizing effects of battle stress. Positive group identification has been repeatedly demonstrated to be the distinguishing characteristic of successful combat units which endure severe battle losses with a minimum of combat failures. Its benefits are strikingly revealed when group unity is suddenly disrupted by catastrophic battle conditions. The remaining members stripped of their support are suffused with tension and many become temporarily ineffective.

Unfortunately, not all units form favorable group identifications. Their combat efficiency, if any, is solely due to the work of a few aggressive individuals. Such groups are merely collections of soldiers in a military unit. Other organizations may exhibit the cohesiveness and other characteristics of group identification

but are poorly motivated for the combat mission. Members of such a group support each other in condoning combat failure and influence newcomers to adopt a similar negative attitude.

Another potent influence in battle adaptation is the combat leader because of his favorable position to initiate and maintain group identification. Leadership is another spontaneous social phenomenon that arises in battle because hazardous situations produce a strong demand for guidance and help. The leader who fulfils this need can exert extraordinary influence upon the attitudes and behavior of his men. For this reason leadership has been recognized as a vital force in the success of combat units since the beginning of recorded history of warfare. On the other hand, inability to perform adequately in combat, as well as callous or unfair management, will almost certainly evoke negative group motivation.

In the further consideration of forces that influence adjustment in combat, there has been a growing recognition of the role of communication. In combat units, communication not only links individuals together, provides a basis for a predictable environment and prevents the anxiety of isolation, but the information transmitted facilitates appropriate behavior. Without knowledge as to the whereabouts of friendly or enemy forces and the purpose and nature of the battle mission, the combat participant does not know where and when to exhibit aggressive action. The result is inaction with its consequent damming up of tension and decreased effectiveness. Methods and channels of communication assume an ever increasing importance since the source of information, the choice of words or nonverbal cues used and the manner in which they are transmitted may convey different meanings or degrees of urgency.

In summarizing the advantages of a field theoretical approach to the causation of combat exhaustion, it is the contention of this paper that such a conceptual framework permits a broad view of the various forces which influence adaptation in battle yet does not prevent an appreciation of cause and effect relationships due to a heightened intensity of this or that element of the combat situation or any special circumstances, assets, or defects of involved individuals. It is herein submitted that a field concept may be usefully applied in many diagnostic and treatment problems of civilian medicine. Such a field approach to the causation of disease would enable the physician to enlarge his sphere of observation from single causes to the multiple influences which impinge upon the patient that include family problems, work adjustment, social relationships, economic difficulties, and authoritarian pressures, as well as mind-body interrelationships and physiological or structural derangements. Here also the physician can focus upon a particular cause and effect reaction such as physical trauma or infection which is the major element at the moment while still retaining awareness of the other forces involved in adaptation.

Another principle of combat psychiatry that may be useful in civilian medical practice involves the purposefulness inherent in psychiatric breakdown and non-effective behavior. It has been long recognized that symptoms of disease such as fever, inflammation, edema, joint changes, and the like, represent both a disruption of bodily function and defensive mechanisms evoked for the purposes of healing and adaptation to physiological or structural change. Since such reactive processes operate at the level of tissue or cellular activity, often their unreasoning efforts produce even further disturbance and destruction of local and general function. Similarly, the manifestations of psychological disorders exhibit meaningful mechanisms of adaptation, for the inability to overcome frustration or master environmental situations brings forth substitute behavior of a lower level in an effort to reach some satisfactory compromise solution for both internal needs and external demands. As suggested by Rioch (4), behavioral patterns observed in psychological breakdown may be considered as points on a continuum or scale of

adaptation which varies from a relatively high degree of integrative capacity that is capable of memory and judgment and presumes a functional participation of the cerebral cortex to primitive levels of unthinking stereotyped and reflex behavior associated with brain stem and spinal cord control. The purposefulness of human adaptation is perhaps most clearly demonstrated in combat where failure to cope adequately with threatening or desperate situations produces so much painful tension that in order to obtain relief many participants are consciously or unconsciously influenced to utilize evasive or regressive patterns of behavior. Even in the bizarre types of combat breakdown such as mutism or uncontrolled panic flight, one can discern primitive efforts to escape from a terrorizing environment. Less severe abnormalities such as hysterical syndromes, self-inflicted wounds, and desertion from battle more readily portray their purposeful nature. In the milder forms of combat exhaustion characterized by trembling, tearfulness, and verbal expressions of fear, a childish pattern of behavior is quite evident.

The form or type of non-effective behavior displayed in combat is only occasionally determined by the early formative period of development. More commonly it is dictated either by the practical circumstances of the battle situation or the group acceptance of such behavior. To illustrate the effect of the combat situation upon the manifestations of noneffectiveness are the following examples: Very few psychiatric casualties occurred during the day of the attack upon Pearl Harbor from either army troops or naval personnel who were involved (5) (6). Here was a situation in which being a psychiatric casualty served no useful purpose. Similarly, psychiatric breakdowns are uncommon in naval personnel engaged in battles at sea (7) (8) (9). Psychiatric casualties were also few in number during a hazardous retrograde action as was illustrated in the difficult withdrawal from North Korea in late November and early December of 1950 during which medical facilities were also under attack and it was obviously more advantageous to remain with the combat group (10). Seldom does a psychiatric casualty become manifest during a patrol action but does occur after the patrol has reached the safety of its own lines. None of the foregoing should leave the impression that non-effective behavior cannot occur under such situations as listed above, but rather that the manifestations of such ineffectiveness are determined by whether or not they are appropriate to the combat situation. A final example illustrating this point concerns the frequency of AWOLs* from combat. For obvious reasons this type of abnormal behavior was rarely seen in the island campaigns of the South Pacific Theater in World War II and in dangerous guerilla-infested South Korea during the early phases of that campaign (11). In sharp contrast were the relatively common instances of desertion and AWOL in the Mediterranean and European theaters of World War II where the rear cosmopolitan cities of Rome, Paris, and Naples beckoned with implications of safety and pleasure.

The influence of the combat group upon the type of non-effective behavior manifested is also pertinent. New units when placed in an initial severe battle action usually have their highest incidence of psychiatric casualties in which there occurs the largest number of bizarre syndromes such as hysterical reactions and dissociative phenomena. As units become battle hardened and there is developed group cohesiveness and group standards for conduct, not only is there a decrease of psychiatric casualties but their manifestations become more or less uniform with little of the dramatic quality previously displayed. Such cases exhibited trembling, noise sensitivity, sympathetic overactivity, and verbalized that they "can't take it" or "can't stand them shells," which was accepted by the combat group in World War II as a correct end stage or breaking point. Bizarre behavior was frowned upon and not considered a necessary prerequisite for evacuation.

* Military abbreviation for Absence Without Leave.

An interesting example involving group acceptance of behavior occurred with ROK (Republic of Korea) troops. Early in the Korean campaign, psychiatric casualties from ROK units were rare due to their relative lack of medical facilities and psychiatrists. However, other forms of non-effectiveness were common. When ROK soldiers were placed in American units they incurred psychiatric breakdown with a similar frequency and identical manifestations of their American buddies.

To recapitulate briefly: Experiences of combat psychiatry have confirmed and elaborated upon the thesis that behavioral abnormalities and disease represent both a breakdown in function and a meaningful adaptation to stress. Manifestations of the more highly integrated types of such a defensive process can be altered by external forces that originate from the practical exigencies of the environment and social pressure. This does not imply that non-effective behavior in illness can be banned by the group or eliminated during a desperate situation but only that the form or manner in which such failures are expressed can be changed by outside forces. The application of these findings to civilian medical practice lies not only in a more comprehensive understanding of the role played by illness and deviant behavior but in the realization that even in failure of adjustment restitutive efforts are being made as the individual consciously or unconsciously endeavors to make the best adaptation possible under what are actual or only apparent unfavorable circumstances. Equipped with this information the physician is not so prone to attempt quickly and ruthlessly the removal of defenses in disease and abnormal behavior because of the awareness that greater disorganization may follow that will require even more primitive adaptive mechanisms. For example, many so-called psychosomatic diseases or other chronic disorders may provide certain needs for the patient that are otherwise unobtainable. In such instances the physician may find it expedient to reinforce temporarily the disease defenses if they are in imminent danger of collapse and then deal with the etiologic forces that have created the necessity for such a defensive adaptation of illness.

The fact that symptoms of physical and mental disease can be influenced by environmental pressure is also extremely valuable from the standpoint of diagnosis and treatment. It is well known for symptoms to be influenced by family, friends, and the social values for disease. Tuberculosis, syphilis, and psychosis represent "bad" or undesirable illnesses. Consequently, their characteristic symptomatology is apt to be subdued or repressed, whereas manifestations associated with honorable and unavoidable physical injury can be more readily put forth. In some emotionally disturbed persons, economic restriction or a lack of sophistication may make impossible a verbalization of the same neurotic symptoms that are eagerly brought forth by similarly frustrated persons from a cosmopolitan setting who have ample financial means. Not the least of the sources that influence the type and variety of complaints are the physicians themselves whose questions and probing often communicate the proper symptom for this or that positive or negative finding of the professional examination. The iatrogenic causation of symptoms was clearly exemplified by a study of low back syndromes during the Korean campaign (12). Most individuals in this survey were evacuees to Japan from Korea for severe low back pain that had been diagnosed as "herniated nucleus pulposus." Many patients of this series with no objective evidence of root irritation gave a convincing history and symptoms of lumbar disc disease. The course of the iatrogenic suggestions could be traced from the negative history given in initial statements to the medical officer and the rapid emergence of the positive syndrome, as noted by the records of each successive medical facility in the evacuation chain.

In considering the problems of treatment, several principles of therapy have been learned from the trial and error experiences of combat psychiatry during the two World Wars and the Korean Campaign. The first of these pro-

cedural principles termed "decentralization" insists upon bringing treatment to the patient whenever practicable rather than evacuation of psychiatric casualties to a hospital facility. A decentralized program of combat psychiatry has demonstrated the following benefits: (1). Treatment can be given earlier during the fluid and reversible stage before time has hardened a temporary disability into a chronic neurosis. (2). At a decentralized or forward level where the patient is still emotionally tied to his unit and struggling with realistic external situations relatively simple treatment procedures are appropriate and remarkably successful in restoring previous ability to perform effective service. In marked contrast is the frustration encountered at the hospital level of contending with the symptoms and hostility of the now fixated chronic patient who fights to maintain his favorable hospital status. It is apparent that removal to a safe and comfortable environment has also removed any necessity for the patient to continue uncomfortable and hazardous efforts to master the combat situation. Unfortunately, this failure to overcome military stress if allowed to succeed often initiates a pattern of evasive and helpless adaptation which continues to operate in the inevitable vicissitudes of later civil life (3). Medical personnel engaged in treatment at a decentralized level have the opportunity of obtaining first-hand knowledge of combat conditions. They are therefore better equipped to receive and understand communications from patients and other combat participants and thus avoid unrealistic recommendations and dispositions that so frequently characterize the decisions of hospital or more remote medical personnel who have little practical understanding of duties or functions in the combat zone (4). Forward treatment serves to decrease the frequency of psychiatric casualties, for their relatively temporary and benign nature are established by prompt restoration to duty. On the other hand, evacuation of psychiatric casualties cannot fail to impress other combat participants that discomfort, tension, and fear represent an illness of sufficient severity to warrant removal from battle and hospitalization.

The doctrine of decentralization has also been successfully applied to non-combat military psychiatric disorders by the utilization of mental hygiene units which treat patients on a duty status while they are still attempting to solve current difficulties, thus preventing hospitalization and its almost inevitable adverse complication of gain in illness.

A second operating principle of treatment in combat psychiatry designated as "expectancy" (13) refers to the importance of the attitudes displayed by medical personnel when dealing with acute psychiatric disorders. Experiences of World War I, World War II, and Korea clearly indicate that most psychiatric casualties improve or worsen depending upon what behavior is expected of them by personnel responsible for their medical management. This finding of increased suggestibility stems from the characteristic indecision and helplessness of early psychiatric casualties in whom there wages a struggle between selfish desires for relief from discomfort and fear and the equally potent obligations imposed by self-critical faculties and the combat group, as well as a strong motivation to rejoin friends and buddies in whom there is a powerful emotional investment. Under these conditions the proper role to be assumed can be readily inferred or suggested from the attitudes and behavior of others. The usual hospital setting which places emphasis upon disease and disability solves the patient's dilemma in favor of continued symptoms. Evacuation to a specialized treatment center confirms the illness role, for here a decision has been reached by others who are obviously more qualified. On the other hand, a calm acceptance of the patient's complaints and story of severe battle trauma as being a temporary breakdown from which prompt recovery is expected after a brief respite from battle can produce rapid and dramatic improvement within hours or overnight. This expectant attitude for recovery must be exhibited by all medical personnel in the treatment environment whether the decentralized

level of operations be that of an aid station, clearing company, or field hospital.

The third axiom of therapy in combat psychiatry which is based upon the utilization of decentralization and expectancy stresses the value of brief simplified methods. The utilization of more complicated treatment for acute psychiatric casualties such as prolonged sleep, subshock insulin, repeated oral administration of barbiturates, frequent or prolonged psychotherapeutic interviews, narcosynthesis or barbiturate interviews, and nonconvulsive shock therapy indicate that at best only mediocre results are obtained for return to combat duty. Such complex methods require time and special facilities which give the implication of a serious mental disorder or disability and thus defeat the benefits derived from expectancy and decentralization. Consequently, an illness role is likely to be perpetuated or at least a conviction of unfitness for combat function.

It is apparent that one cannot remove the memory of painful battle experiences, alter personality traits, or change the circumstances of battle. The same person must be enabled to face again similar conditions which have so recently caused his breakdown. No magical routines, drugs, or psychological explanation of the past or present can change the harsh reality that must be endured. However, an optimistic viewpoint can be taken because prior to breakdown most psychiatric casualties had the capacity for effective behavior in battle. Treatment must therefore be aimed at a restoration of this former competency. This can be accomplished by a brief removal from battle along with measures to relieve hunger, fatigue, and other physiological impairment which when performed at a decentralized level in an atmosphere of expectancy for recovery provides the most favorable conditions for a resurgence of the sustaining forces to regain control of behavior.

Psychotherapy under this simplified program, while necessarily brief, is directed toward the combat situation with little attention paid to the remote past or analysis of personality for explanations of the present breakdown. The therapist should maintain an interested and sympathetic attitude as he insistently guides the patient to verbalize the contents and ventilate the feelings that pertain to recent battle experiences. Reassurance is then given along with a definite decision insofar as final disposition is concerned. As previously stated, acute psychiatric disorders are overly suggestible and suffer from mixed feelings regarding return to duty. Therefore, any vacillation or indecision by the therapist is promptly communicated to the patient with a consequent adverse effect. Delay in making a decision, such as stating that disposition will depend upon a later evaluation, causes even worse results, for then the tense, unhappy patient can obtain little benefit during rest and relief from battle as he waits, preoccupied with anxiety over the outcome of the next examination. A certainty of future events, no matter how undesirable, is less tension provoking than an unpredictable situation.

Drugs should be used sparingly and only in small doses to insure needed sleep. Most cases of combat exhaustion have relatively little disturbance over ability to sleep or eat. Large doses of sedation produce further helplessness and depress the very sustaining forces necessary for recovery. A rapid physical survey which includes the recording of temperature should be performed on every acute psychiatric casualty because intercurrent illness is not infrequently a precipitating force in the breakdown of resistance against the disorganizing effects of fear.

The civilian physician is strategically placed to utilize the treatment principles of combat psychiatry in the many non-psychotic psychiatric problems and borderline syndromes encountered in medical practice. Like the battalion surgeon in a military setting, the practitioner also operates at a decentralized level where he has the opportunity to observe and become aware of the various situational forces that impinge upon his patients. He is thus equipped to perform early treatment while the individual is still attempting to maintain emotional equilibrium. It is apparent that the

referral of all psychiatric and psychosomatic disorders to clinics or psychiatrists is not only impossible from the standpoint of available resources, but quite unnecessary if the physician can overcome his prejudices or awe of the "unknown" insofar as psychological difficulties are concerned and realize his advantages in this sphere over the more distant clinic and hospital personnel.

SUMMARY

Observations of the accelerated and magnified physiological and psychological mechanisms in combat have made evident certain operational principles of adaptation in behavior and disease which are deemed applicable to civilian medical practice. Experiences in combat indicate that the cause of illness and deviant behavior is best understood by a field theoretical approach which considers multiple, simultaneous, and changing etiologic forces rather than a linear cause and effect hypothesis. Manifestations of failure in combat adaptation were found to represent a meaningful defense against stress, whose form or type could be altered by environmental and social pressures. In regard to the treatment of combat psychiatric casualties, emphasis was placed on the importance of performing therapy by brief simple methods at a decentralized level in an atmosphere of expectancy for recovery. It is submitted that physicians have a unique advantage and a superior opportunity for applying the principles of combat psychotherapy in the common psychiatric disorders of civilian medical practice.

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The Mütter Museum—Then and Now

By ELLA N. WADE*

THERE is a large bound volume in the Mütter Museum of the College of Physicians with the title, "Minutes—Committee Mütter Museum." This is a revealing record of Committee activities from November 6, 1865 to December 22, 1922, and after reading its pages from 1865 to the early 1900's one feels that it could very appropriately be named "The Good Old Days of the Mütter Museum Committees."

In 1865, under the bequest of Dr. Thomas Dent Mütter his collection of pathological material, valued at $20,000, became a part of the College museum that was begun in 1849, together with an endowment of $30,000 to be devoted to the care and maintenance of the museum. This is known as the Mütter Fund.

A suitable fireproof building having been provided for the housing of the museum in accordance with the will of Dr. Mütter, cases and jars, of course, were needed to accommodate the new specimens, and we note that from 1866 to 1900 $1956.02 was invested in new cases. Also, from 1866 to 1879 museum jars were purchased at a cost of $227.11. In this period of thirteen years a total of $916.55 was taken from the fund to pay for lumber, carpenter work, bricklaying, painting and plumbing, all probably necessary in connection with the assembling of the museum.

Now that essential work had been completed, the Mütter Museum Committee, as the minutes show, proceeded to spend Dr. Mütter's money like sailors on shore-leave. It seemed that every time a Fellow of the College contemplated a European trip, which occurred frequently, funds were put at his disposal for the purchase of any worth while museum material that he saw while there, or for any collections that he heard were available. Besides, he was reimbursed, and rightly, for any expense incurred by him in this connection, so the curator's visit to Professor Hyrtl relative to his collection cost the museum $120.52. From 1866 to 1900, $13,005.30 was spent from the Mütter Fund for museum specimens. Among these purchases, besides the Hyrtl Collection, were Sappey's Lymphatic Injections, Plastic models by Auzoux, the Politzer Collection of Tympanic Membranes, and the cast of the Siamese Twins.

No one questions the wisdom of the above selections, for each adds much to the fame of the museum, but it is only natural to puzzle over the fact that much of the material for which large sums were spent seems to exist no longer, and a thorough search in cupboards and store-room fails to produce them. For instance, in 1866 Dr. W. W. Keen was given $350 by the committee with which to buy Dr. A. Zeigler's collection of anatomical preparations and "phantoms" of the ear, abdomen and brain, but they are not now in the museum. In 1867, $6.00 was advanced for the iron work on the skeleton of a horse. The museum has no skeleton of a horse, nor is there any iron work that could have been used for that purpose. In 1867, also, the curator was ordered to pay Mr. Le'dion $998.00 for models of pathology, which he did, but these cannot be located. Five models of melanosis purchased from the same gentleman for $81.25 in 1870 are also missing, and none of the above mentioned even appear in Dr. Hinsdale's catalogue of 1884 or in the card catalogue of 1899, so they evidently disappeared before that time. In 1871, 268 osteological specimens were bought from H. H. Smith at a cost of $1000. About a dozen, today, are so labeled. Some bones are merely marked "purchased." Might these be some of the expensive H. H. Smith collection? There is no

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way of knowing. The twelve models of tumors bought in 1880 for $196.75 from M. S. Nardyz are also non-existent. What could have happened to so much costly material? What, also, could have happened to six dozen chairs purchased for $6.75 a dozen in 1899 to accommodate students attending lectures in the museum? True, chairs wear out in forty years or more, yet the work tables acquired at the same time are still here.

This interesting book also discloses that an enormous amount of work was required on museum specimens from 1867 to 1879. The man most frequently hired for this work was R. H. Nash. We have not been able to determine who R. H. Nash was. He may have been a private individual who specialized in museum work or he may have been employed by some company in the business. Whoever he was, he received from the museum $2545.90 for assembling some skeletons and other work, not specified or merely listed as "sundries," during that twelve year period. Part of the time we learn he worked for $3.00 a day, but this later was increased to $4.00. Two other men participated in museum assembling. One was James McShane who collected $23.00 from the Museum Committee, and the other, Jules Bailey whose charge was $240.

The term "sundries" is rather mystifying. It appears all through the minutes from 1867 to 1879 as "amounts due the curator." One month $46.93 was listed as due him for "sundries." Another time it was $31.53 and for still another month $30.05. The total for that period amounted to $358.54! Nothing was itemized and even on the check-book stubs the amounts are only mentioned as due the curator for "sundries." What, pray, constituted sundries in those days? The museum was open only one hour a day; correspondence, as far as we can determine from some of the files, was written in pen or pencil on any scrap of paper that was available. The museum had no personal stationery until much later. What did the curator buy with that money?

The very large calculi collection that came to the museum with Dr. Mütter's specimens obviously had never been identified. Dr. Bridges, in 1867 was hired to do it and was paid $300. In 1867 this was no trivial sum, but perhaps Dr. Bridges was not over paid for it must have been quite a task because of the large number and he furnished a complete analysis of each calculus.

We assume, from these minutes, that the museum was in a much better financial position than the library in those days for from 1866 until 1882 the Mütter Museum Committee spent $394.69 for books, and from 1882 until 1885 the library committee received a yearly appropriation of $200 from the Mütter Fund with which to buy books on anatomy.

The first complete catalogue of the museum was begun in 1884 by Dr. Guy Hinsdale, who in 1883 replaced Dr. William Hunt as curator. The catalogue consists of three large typewritten volumes with the majority of specimens described at length, and for which Dr. Hinsdale received $1000 from the Mütter Fund. The museum needed a catalogue and this was a good one.

In 1899 it was estimated that the cost of a card catalogue would be $200 yearly. The records show that Dr. Riesman received $410 for this work. Whether this represents the entire cost we do not know as no further mention is made of it.

In 1910, Dr. J. P. Tunis received $100 for nine head sections which were formally presented in April 1911, and in 1915 the museum bought the present balcony cases for $860.

Repair to specimens also came out of the Mütter Fund and in 1879 $45.75 was spent for work on some models and a microscope.

All of the above mentioned disbursements were approved, it seems, with no more deliberation than the present committee gives to the spending of a dollar or two.

Between 1916 and 1927 major purchases were made but only after careful consideration. It was in 1923 when the excellent J. S. Fraser collection of lantern slides on the Pathology of the Ear was bought for $87.85 and a G. S. Moler sectional lantern slide cabinet and table to accommodate it obtained for $111.62.

In 1925 the expenditure of $4,430 made a decided improvement in the appearance of the museum for it was then that the committee supplanted a few of the old wooden cases with modern all glass ones in which most of the skeletons are displayed.

When Dr. Chevalier Jackson, in 1927, presented the collection of foreign bodies removed from the lungs and bronchi of patients, cases were needed in which to keep them. The committee paid $292.50 for these and another $170 for the dust-proof arrangement in the drawers. An anonymous gift of $220 was received by the committee to pay for the case which now holds the Philadelphia Award that Dr. Jackson received, and the bronze plaque of him modelled by R. Tait McKenzie.

In 1923, while dwindling finances did not seem to have become a major problem, still the committee took steps to avoid having one financial responsibility increased. In December the Chairman of the Mütter Museum Committee announced that unofficially the librarian, who also acted as superintendent of the College, had asked the committee to consider an increase in its annual contribution towards the electric light bill of the College from $120 to $300! The Committee immediately voted that a conference be held between its chairman and the chairman of the House Committee to discuss the question of the annual quota. No reply was received from the House chairman and after being held over as "unfinished business" for a matter of a few months it was dropped from the minutes until March 1926 when the chairman reported that "Council resolved to assume the responsibility for the payment of lighting, heating and other expenses incidental to the housing of the collection, and will relieve the committee of the yearly payment of $120 for this purpose."

Investments brought substantial amounts into the Mütter Fund from 1866 to 1900, and in 1881 we find that $8500 was on deposit, $7000 of which the chairman was ordered to invest, and in 1883 the committee asked permission of the College to place $2000 of "accumulated interest" in the hands of the Pennsylvania Company to be added to the principal.

After 1927 the "good old days" seem to be on the decline. If no rainy day had materialized, at least clouds started to appear. No new specimens were purchased, no extensive changes made and "accumulated interest" was not so great as to be of concern to the committee. Investments ceased to bring in much more than a quarter of the income that they did seventy or eighty years ago, so that today one finds the Mütter Museum Committee in a rather precarious position and the museum in a somewhat dilapidated state unable to afford new equipment or even to remodel the old. It has to rely entirely on Fellows of the College and their friends for new specimens, and while historical material, frequently so rare as to be without price, is presented, real cash from outside sources has never found its way into the Mütter Museum Account.

The museum has been in existence since 1849 and many of its cases, if not that old, at least date back to 1866 and 1867. While they may have been the last word in museum case construction at that time, they are now, almost ninety years later, very much out of date and unsatisfactory for display purposes, as the wide wooden frames obstruct the view of the interior and exclude light which is very much needed since the antiquated lighting system is inadequate.

Even in 1874 when the museum was housed in another building of the College, the Mütter Committee saw the disadvantage of poor lighting, and in 1914, in the present building, they were far from satisfied with the wooden cases, for the minutes of that year show that a motion was made to obtain estimates for replacing the wooden tops with plate glass to allow more light to enter. This action, however, was deferred and as far as we can learn was never again mentioned. Now, however, in 1955 in the plans for remodelling the present building, the museum, we are told, is to get an entirely new system of illumination which will add much, not only to the appearance of the place but to the value of the specimens which at present

cannot be seen to advantage on account of disagreeable reflections.

The height of most of the cases is another disadvantage. Many are eight feet tall and contain six shelves. No individual of average height can see the specimens and labels on the two top shelves and their purpose would be as well served in the basement store-room. Even the few all glass cases in the main room of the museum could be two feet shorter for it is only the skeleton of the Mütter Giant that requires one as tall.

It is unfortunate that when money was plentiful more of the wooden cases were not discarded or at least remodelled to make them more accessible. Why they were so constructed in the first place is a mystery. It is apparent that the ones who made them were never obliged to use them. A case having a width of eight feet has but one two-foot door in the center. This means that one must reach three feet on either side to remove or replace specimens in the far ends. When it becomes necessary to remove specimens for cleaning, which in this neighborhood is frequent as the College collects enormous amounts of dirt from the two near-by railroads, and then later to replace them and attach new labels, one must resort to various devices to accomplish it. When the long arms of Gilbert, our obliging little janitor fail or he is not available, we have succeeded with a length of fishing rod, a long paint paddle and a few physical contortions.

The only new case purchased in the past fourteen years is a small one bought at a neighborhood second-hand store for $10 for the purpose of displaying a few exhibits at the American Medical Association Convention in Atlantic City. This, however, is one that must be hung on a wall and until an extra room in the basement is annexed to the museum, which provision is also a part of the present building plan, it cannot be used as there is no wall space.

The round museum jars with the glass lids that clamp down tightly with iron clamps and which were approved in 1879, are still in use. Many of these are cracked necessitating frequent additions of formalin, and the rubber gaskets between the lids and jars have softened, and in many instances have run down on the inside of the vessel making a sticky mess that is unsightly and almost impossible to remove. New lids and gaskets are not available as the jars, once manufactured by Whitall Tatum and Company, are no longer made. The finances of the museum will not permit replacements. Since 1879 there is no record of the purchase by the museum of any new jars until 1942 and 1945 when two were purchased as absolute necessities at a cost of $4.00 and $4.50 respectively.

While, as before mentioned, the museum spent $916.55 for manual labor and $358.54 for sundries during twelve prosperous years (and this did not include formaldehyde or alcohol or the cost of printing the posters for the yearly Mütter Lectures), between 1942 and 1955 any repairs were assumed by the superintendent or janitor at no cost and even including eight carboys of formaldehyde and the cost of the posters for the Mütter Lectures, only $384.56 was spent. Besides sundries this amount also purchased two sections for the filing case, a second-hand typewriter from the library and a substantial amount for its repair, two typewriter tables, a magnesium stepladder and a quart of red paint for the firescreens in the museum.

Unlike the committees of former days we carefully list in detail the items covered by "sundries." The purchases under this heading consist of stationery, postage, labels, tags and other small items incident to the daily care of the museum. But even with a yearly appropriation allotted by Council to the Committee on College Collections for some of this material, we must budget carefully for supplies become more costly each year.

The major expense during the past seven years was the printing of a new Mütter Museum Catalogue. At the suggestion of Mr. McDaniel, at that time librarian of the College and editor of the *Transactions & Studies* of the College, installments were published in various issues of the College journal. Reprints were

later assembled and bound, and the complete cost of about 175 copies of this printed catalogue was $146.45.

In later years separate insurance on museum specimens has been discontinued and recently physicians who have delivered the Mütter Lectures have kindly returned or refused to accept the stipulated two hundred dollar honorarium for which we are sincerely grateful. It has increased the balance in the Mütter account to some degree.

In the present building plans, which were before mentioned, the museum will acquire an additional room, most of which will be devoted to the display of exhibits with a small portion walled off for storage of duplicates and items of minor interest. But, alas, how are we going to exhibit unless we acquire more cases? It is case room that is principally needed, and the few cases now in the store-room are in no condition to be used for that purpose, nor can they be made presentable. This seems to be one bridge to span when the time comes.

No one begrudges the curators and committees of former days the pleasure of freely spending money for museum specimens when both money and material were available, but when we consider the comparatively small balance in the Mütter Museum Fund we can not help but express the vain wish that more thought had been given to economy from 1867 to 1879 so that the Committee on the Mütter Museum in 1955 might invest in much needed furnishings and other necessities for museum growth.

The School of Medicine at Jundishapur: The Birthplace of Arabic Medicine

By IRWIN A. BRODY, A.B.*

THE fact that the medical writings of the Arabs were translated and treasured by Western scholars during the Middle Ages is well known. Equally well known is the fact that Arabic medicine, with the exception of pharmacy, is little more than an elaborate system of commentaries on the Greek medical authors. It may be of interest, therefore, to turn our attention toward an area that is still rather obscure and to inquire into the question of how the medicine of the ancient Greeks was transplanted to the East and imparted to a desert tribe of rude nomads.

In the remote town of Jundishapur in the province of Khuzistan in South Persia, a medical school flourished during the seventh and eighth centuries A.D. that may fittingly be described as the birthplace of Arabic medicine. This school not only sent into the world trained physicians of the very highest type, but also preserved a body of Greek medical works and maintained an active tradition of careful translation of scientific writings. Thereby this school was instrumental in creating and guiding the early course of the Arabic Renaissance. From the school at Jundishapur the Arabs learned Greek science and, being in the heyday of their power and glory, spread it rapidly throughout the Moslem world.

Thus, during the eighth century, at a time when the intellect of Europe was so clouded by monkish fables that monasteries were buying milk purporting to come from the breasts of the Blessed Virgin, the physicians at Jundishapur were studying and teaching the works of Hippocrates and Aristotle. These teachers at Jundishapur, however, were themselves very devout Christians of the Nestorian sect, and the strange picture of a scholarly group of Christian physicians flourishing in Persia amongst bigoted Zoroastrians and later amongst fanatical Moslems is intimately connected with the equally strange picture of a horde of desert-dwellers deliberately trying to educate themselves up to the intellectual level of the ancient Greeks.

* Winner of the first annual essay contest sponsored by the Section on Medical History, College of Physicians of Philadelphia.

THE NESTORIANS

When Nestorius, a priest from Antioch in Syria, was consecrated Patriarch of Constantinople in 428, he proclaimed to the Byzantine emperor, "Give me the earth purged of heretics, O Caesar, and I will repay you with heaven." Nestorius fell enthusiastically to his task of enforcing religious orthodoxy, but in the course of enunciating Church doctrine, he soon found himself accused as the arch-heretic of the age.

St. Cyril, the bitter rival of Nestorius, presided at the General Council of Ephesus in 431, and won from the Council the deposition and excommunication of Nestorius and the anathematization of his teachings. Nestorius retired to a quiet monastery near Antioch, but was finally banished by the Byzantine emperor to the Great Oasis of Upper Egypt, where he died.

Nestorianism, however, was by no means exterminated after the Council of Ephesus. The Nestorian party left the hostile environment of Antioch and moved eastward to Edessa in northern Mesopotamia, within the extreme eastern frontier of the Byzantine empire, and established there a new center of Nestorianism.

Because of their status as heretics the Nestorians had been debarred from political activity, from many business pursuits, and probably from landholding as well. They consequently turned their energies to the cultiva-

tion of learning and acquired wide knowledge not only in theology but also in philosophy and natural science. In addition, the rational and humanistic bent of their religion perhaps predisposed them for literary and scientific activities. Thus when the Nestorians reached Edessa, the superiority of their attainments was soon recognized by the natives, who embraced the new doctrines, albeit heretical, and made way for the newcomers in their seminary and medical school.

The knowledge that the Nestorians brought with them into exile was fundamentally Greek. Greek was the language of the educated on the eastern shores of the Mediterranean, and scientific knowledge was based on a familiarity with the ancient Greek writings. But when the Nestorians migrated into Mesopotamia they found themselves in a land that had never been thoroughly Hellenized and amongst a people who spoke only Syriac, a language closely related to ancient Aramaic, which in turn is akin to Hebrew. The Nestorians proceeded to translate into Syriac the Greek manuscripts in their possession and other Greek writings that had previously found their way to the school at Edessa. Through the Nestorian zeal for scholarship, Edessa became the "Athens of the Aramaic world" and the cradle of Syriac literature, but its prosperity was shortlived. The gentle flame of learning could not long escape the raging winds of Byzantine orthodoxy, and in 489 the emperor Zeno dissolved the school as a center of heresy. The lecture halls were destroyed, and the emperor used the wreckage to build a church dedicated to Mary, Mother of God—a vindictive answer to the Nestorians, who opposed the deification of Christ.

Expelled from Edessa, and indeed from the length and breadth of the Byzantine Empire, the persecuted Nestorians sought refuge in the empire of Persia. The theologians of the sect made their way to Nisibis, which was already famous for its Jewish and Christian seminaries, but the Nestorian physicians went further eastward into the heart of Persia where they united with the medical school of Jundishapur.

THE PERSIAN EMPIRE

The city of Jundishapur had been founded by the Persian king Shapur I, the second monarch of the Sassanid dynasty, about the year 260 A.D. On a campaign against the Romans, Shapur had conquered and sacked the city of Antioch. He commemorated this victory by naming his new city "Jundishapur," which means "Shapur's better than Antioch."

Shapur's wife was the daughter of the emperor Aurelian, and, as a compliment to his daughter, the Roman emperor sent several Greek physicians to Jundishapur, where she resided. These physicians probably established a tradition of Greek medical scholarship at Jundishapur, but at any rate, a university was established in Jundishapur during the fourth century by Shapur II, and here the Hippocratic system of medicine was publicly taught. Under royal patronage Jundishapur was a prosperous city by the time of the arrival of the Nestorians at the end of the fifth century, boasting, besides its university, a flourishing perfume and weaving industry.

The Sassanid monarchs were fervid Zoroastrians and frequently indulged in fanatical persecutions of the Christians. Especially was this true when Christianity became the official religion of the Roman Empire, because the Sassanids, always the rivals of Rome, now looked upon the Cross as the Roman standard and could not tolerate its presence on their side of the frontier. But despite their anti-Christian sentiments, the Persian shahs were well disposed toward the Nestorian refugees as outcasts from the hated Christian empire. The Sassanids were ready to extend their protection to anyone discontent with Byzantine rule, and the shahs not only welcomed the Nestorians but ordered all Christians throughout the Persian realms to profess Nestorianism and embrace the anti-Roman doctrines of these newcomers.

It was also fortunate for the Nestorians, as well as for Greek medical science, that their arrival in Persia coincided with the reigns of enlightened monarchs who respected learning.

The celebrated shah, Chosroes the Great, sought to introduce into Persia the philosophical and scientific knowledge of other countries and is remembered in the history of medicine for bringing the school at Jundishapur to its greatest prosperity. He opened the path for the coming of many Hindu physicians to Persia, and invited to his court noted foreign scholars, many of whom undertook translations of scientific works from Greek into Syriac, which, because of the Nestorians, was now the language of the learned in Mesopotamia and Persia.

By the end of Chosroes' reign in 579 Jundishapur had become the greatest intellectual center of the East and a renowned clearing-house of philosophic and scientific ideas. Greek, Christian, Jewish, Syrian, Persian, and Hindu medical knowledge was being constantly compared and exchanged in its cosmopolitan environment. One of Chosroes' interests was to patronize the translation of Plato and Aristotle into Persian, and this enthusiasm for translating invigorated the ever-active school of translators at Jundishapur. The Nestorians were especially well fitted for the task of translation because of their polyglottism. They knew Greek, Syriac, and Persian, and, moreover, they had in their possession an important body of Greek medical works and Syriac versions of Greek texts. Indeed, the wealth of ancient documents at Jundishapur makes the contemporary resources at Monte Cassino seem pitifully small.

The medical teaching at Jundishapur was essentially Greek, but with some Syrian and Hindu accretions. The medical school was associated with a hospital that provided practical instruction for the students. The staff doctors were all teachers of medicine. This hospital was regarded in later times as a model, and its well-equipped dispensary was widely acclaimed. Although physicians of many different nationalities mingled compatibly at Jundishapur, the university was under the control of the Nestorian church authorities, and Nestorian physicians as well as divines were compelled to attend daily religious services before each settled down to his own specific studies. Theology was a major faculty at the university as well as medicine. The influence of the Church at the medical school probably explains the fact that there is no mention in history of any anatomist from Jundishapur.

Despite their dependence on the Hippocratic and Galenic systems and their tolerant, eclectic approach toward other medical doctrines, the physicians at Jundishapur placed more reliance on personal observation than did the medical men of either East or West for many centuries to come. They kept written records of their cases and attempted to deduce general laws therefrom.

THE ARAB CONQUEST

The medical school at Jundishapur was at the height of its fame and glory in the year 636 when its tranquillity was disturbed by the appearance of an army of Arabs at the city gates demanding the surrender of the town in the name of Allah and his prophet Mohammed. After the battle of Nihawand in 642 Persia was completely subdued by the Moslems, and the Arabs were sweeping all before them in that remarkable career of conquest which did not cease until all the lands from the banks of the Ganges to the Pillars of Hercules bowed to Islam.

While the Arabs were glorying in military triumphs and aflame with religious exaltation, refinement and learning possessed little interest for them. The attitude of the early Mohammedans to Greek and Roman literature is neatly expressed in an aphorism attributed to the caliph Omar after the capture of Alexandria with its famous library. "If the books agree with the Koran they are superfluous; if they disagree they are pernicious; in either case they must be destroyed." During this period the school at Jundishapur continued quietly to uphold the finest medical traditions, little affected by the Arab conquests. Perhaps one reason for the toleration of this Christian school by the early Mohammedans is related to Haris bin Kalda, a

Christian who received his medical education at Jundishapur and later became a personal physician to Mohammed. It is believed that Haris influenced the Prophet in his hygienic and medical views. Thus a link between Jundishapur and Mohammedanism was established early in the history of Islam, and the faithful might hereafter lawfully follow the example of their prophet in seeking the medical services of unbelievers.

The caliphs of the Omayyad dynasty began to free themselves of their narrow-minded fanaticism, and, with the seat of government transferred from Mecca to Damascus, the Commanders of the Faithful became more worldly and less fettered to the parochial precepts of the Koran. The Omayyads, early in the eighth century, sponsored the earliest known translation of Greek medicine into Arabic. This was the work of Masarjawaih, a Jewish physician, who translated the *Pandectae Medicae*, a compilation of Greek medical knowledge written in Syriac a century earlier by Aharon, a Christian priest and physician.

The caliphs now felt keenly the deficiencies of their desert people in the realms of refinement and culture and consequently set about to adopt many aspects of the life and thought of the rich civilizations conquered by them. Above all else the Arabs were attracted to a study of Greek science. Perhaps a basic sympathy with the speculative spirit drew them toward the Greeks, but, at any rate, Latin authors seemed not to exist for them, and such writers as Celsus, Pliny the Elder, Scribonius Largus, and Caelius Aurelianus were entirely ignored. Furthermore, the Arabs confined their interest to Greek scientific works and neglected the poetical and historical productions of antiquity. The intensity of their own religious and national feelings had fostered in them the development of an independent poetic consciousness and made them incapable of recognizing the value of Greek art.

THE CALIPHS OF BAGDAD

The real rise of Arabic civilization, however, occurred after 750 with the accession to power of the Abbasid dynasty of caliphs, and Arabic culture especially owes its inception to the second of the Abbasid sovereigns, the caliph al-Mansur, who reigned from 754 to 775.

Al-Mansur was the founder of Bagdad, which he raised from an insignificant village to a renowned metropolis and capital of the caliphate. It was the great Caliph's ambition to nurture a literary and scientific Renaissance, and, in pursuing this end, the Arabs ransacked the globe for Greek scientific manuscripts. But it was within his own realm, in the Persian town of Jundishapur, that al-Mansur found a university where Greek science had long been an established tradition. And there he found the men who were not only well versed in Greek medicine, but who were so well grounded in all departments of scholarship that they could begin at once the vital work of translating the writings of Hippocrates and other classical authors into Arabic.

Al-Mansur, therefore, summoned to Bagdad the director of the medical school at Jundishapur, the Nestorian physician George Bakhtyashu, whose family name means "Servants of Jesus." Aside from their fame in scholarship, the physicians at Jundishapur enjoyed a reputation for clinical proficiency, and thus George was made personal physician to the Caliph as well as head of his literary movement. At Bagdad, George translated many of the medical works preserved by the Nestorians from Syriac into Arabic. Hence Islam received many Greek texts only after they had gone through a Syriac version

The successors of al-Mansur, in contrast to the Byzantine emperors, vied with each other in the promotion of science, and Arabic medicine flourished as the wealth and power of the caliphate reached its zenith in the ninth century. The Paris and London of that time were but miserable villages compared with Bagdad, the emporium of commerce, the center of luxury, and the seat of learning. The caliph's court was thronged with learned men—poets, physicians, jurists, grammarians, scribes, wits, and musicians—and playing a prominent part in this scene were the Bakhtyashus, descend-

ants of George, seven of whom served their caliphs as personal physicians and translators. To this family of Christian physicians, educated at Jundishapur, belongs the chief credit for the splendid results obtained in medicine during the earliest stage of the Arabic Renaissance, which includes the second half of the eighth and the first few years of the ninth centuries. The caliphs showered their favorite scholars with gifts and honors, and George's son, Bakhtyashu bin Jurjis, became one of the wealthiest men in the court of Harun-al-Rashid.

Harun, the grandson of al-Mansur, was the magnificent caliph immortalized in the *Thousand and One Nights*. He was a generous patron of science, and, when his armies captured a city, he looked upon the acquisition of Greek manuscripts as his most coveted booty. Indeed, the surrender of literary treasures was often one of the conditions specified by Harun in arranging a treaty of peace with the enemy. Another method by which Harun and his successors obtained valuable manuscripts was by sending members of the Bakhtyashu family or other scholars to the cities of Syria and Persia to search out and acquire as many Greek manuscripts as possible.

The Bakhtyashus were not only personal physicians to the caliphs but were also the chief representatives of learning in the court, and the profound respect accorded them by the caliphs is illustrated in Harun's reply when reproached by a pious Moslem for taking a Christian, Gabriel Bakhtyashu, with him on a pilgrimage to Mecca. The fortunes of the empire, explained Harun, depended on himself, and he himself depended on Gabriel.

After Bakhtyashu bin Jurjis had been summoned by Harun-al-Rashid from Jundishapur, where, like his father, he had been director of the medical school, one of the Moslem court physicians is reported to have said of him to the caliph: "O Commander of the Faithful, there is no one in this company capable of speaking with this man. For he is a master of disputation. He, his father, and his whole family are all of them philosophers." Aside from being a striking tribute to the talents of a Christian colleague by a Moslem rival, this comment suggests how greatly the Arabs admired the dialectical proficiency of the physicians of Jundishapur and how they valued the skills in philosophical argumentation of the Nestorian doctors far more than their accomplishments as clinical practitioners.

THE MEDICINE OF THE BAKHTYASHUS

The medicine of the Bakhtyashus was considered by the Arabs to be Greek, but it must be remembered that the Arabic interpretation of Greek medicine did not involve a renaissance of the genuine free spirit of the Greeks. To the Arabs, Greek medicine was not the method of honest personal observation advocated by Hippocrates, but a pedantic study rooted in linguistic scholarship. The most ennobling activity for the physician was held to be learned discussion based on familiarity with ancient authors, rather than careful observation of patients or original scientific investigation. Sequences in logic thus frequently replaced sequences in fact, and the form of the thought was often preferred to the thought itself. The Arabs had no concept of the progression of basic knowledge. Greek science was regarded as something permanent, of unalterable value, demanding only elucidation and amplification, but not fundamental critical inquiry. The school at Jundishapur never neglected clinical medicine, but, with a few exceptions, the Arabs claimed as their inheritance only the work of its linguists and antiquarians.

The type of medical treatment demanded by the caliphs of the Bakhtyashus resembled magic more than it did a systematic therapeutic program. Court physicians were expected to bolster their reputations by bringing about sudden, dramatic cures. The art of diagnosis also, as practised in the court of the caliphs, bore a likeness to wizardry. A study of the subtleties of the patient's pulse and urine was supposed to provide the discerning physician with sufficient information to make a thoroughly accurate diagnosis and prognosis.

Indeed, the patient need never be seen at all by the doctor, and many respectable physicians claimed not only to be able to diagnose pregnancy by inspecting the woman's urine but also to predict the sex of the baby.

The Bakhtyashus were by no means the only physicians from Jundishapur who made their reputation in Bagdad. The medicine of the capital was so dominated during the ninth century by Christians and Jews who had received their education at Jundishapur that a poor Arab doctor replied in the following manner when asked why he was living in such miserable circumstances: "In the first place I am a Moslem and even before I studied medicine, people were of the opinion that Moslem doctors were good for nothing. Furthermore I should have the surname Abu Zakarija, or Abu Ibrahim instead of my surname Abul Harith. I wear a white cotton garment, but it should be black silk; and my tongue is Arabic, when it should be that of the people from Jundishapur (Syriac or Persian)."

THE IMPORTANCE OF TRANSLATION

It was under the caliphate of al-Mamun during the early ninth century that the work of translation was given efficient organization. The Caliph entrusted to Mesue the task of translating Greek manuscripts recently acquired by conquest and treaties. Mesue was a Nestorian physician born at Jundishapur, the son of an apothecary at the Jundishapur hospital, and had studied under Gabriel bin Bakhtyashu. He was keenly interested in scientific investigation, and the caliphs supplied apes to him for dissection. His translations for the caliphs were made from the Greek into the Syriac, which was still regarded as the language of the educated, but it is significant that his own original medical writings are all in Arabic. In this fact lies, perhaps, the greatest glory of Arabic medicine. Arabic medicine had comparatively little to do with the Arabs. It was essentially medicine of Greek origin interpreted and amplified by Syrian, Persian, Nestorian, and Jewish physicians. Among the noted Arabic medical authors there are very few genuine Arabs. What the Arabs did contribute, besides inspiration and guidance of aims, was a language—a language that was flexible, readily adaptable to scientific purposes, and that soon became widely understood. It was not long before Arabic became the language of instruction throughout Islam and the learned of many countries could easily communicate with each other. Arabic was thus not only the language of the bazaars but also the language of the lecture room. Hence, scholars and translators in Moslem countries had a great advantage over their counterparts in medieval Europe. The Arabic of al-Mamun's translators was a spoken language—the language in which they worked, disputed, and made love—but the Latin of Constantine the African or Gerard of Cremona was a dead language used only as a method of conveying scholarly ideas or praising God. As Elgood points out, the translators into Arabic could within reason create new words to give an exact rendering of Greek ideas, whereas the medieval European translators risked misunderstanding and even ridicule if they attempted to add to the vocabulary of the Fathers. It is this gift from the Arabs of a uniform language, rather than any direct scientific contribution by Arabians, which justifies the term "Arabic medicine."

Mesue's pupil, Hunain-ibn-Ishaq, brought the first period of the Arabic Renaissance to its efflorescence. Hunain is considered the most profound student of the Greek language among Oriental scholars. He was a Nestorian and commenced his studies at Jundishapur, later residing for several years in Greece to perfect his knowledge of the language, and finally settling in Bagdad. His translations were regarded as classics even in his own time, and it is said that the caliph al-Mamun valued them so highly that he paid for them by their weight in gold.

A school of translators was founded in Bagdad by the Caliph, which became known as the "House of Wisdom." Hunain was head of this group of busy scholars with their vast library. Fresh manuscripts poured in for the translators, especially after the Byzantine emperor

Leo the Armenian acceded to the demands of the Caliph that all the remaining scientific manuscripts of the ancients in Greece be delivered to him for translation into Arabic.

Hunain's methods of procuring and collating original Greek manuscripts were thoroughly scientific and resembled modern procedures. He took infinite pains to obtain good manuscripts of Greek medical texts, and if unsatisfactory Syriac or Arabic versions had already been prepared, he carefully compared these versions with the original Greek in producing his own translation. Hunain's translations for the Caliph and other prominent Moslem statesmen were generally into the Arabic from the Greek originals or from the Syriac versions. The translations, however, that he made for his friends and colleagues, nearly all of whom were Nestorian physicians of Jundishapur or Bagdad, were usually into the Syriac.

Besides the works of Hippocrates and Galen, Hunain translated many of the writings of Aristotle, Dioscorides, Oribasius, Paul of Aegina, and Plato. The Arabic translations of Hunain and his disciples created the main part of the Graeco-Arabic canon of medicine, which dominated Arabic medical science to the nineteenth century and deeply influenced European medieval medicine by means of Latin versions. Hunain's veneration for the word of the Greeks led, as is well known, to the perpetuation of many profound, often ridiculous, errors of the ancients, in the light of modern knowledge. Thus, as a result of Hunain's translations of Plato, it was believed for centuries that the uterus had the capacity for spontaneous movement, like a wild beast, and wandered freely about the body. To entice the uterus downward at the time of parturition, it was recommended to introduce sweet-scented ointments into the vagina.

THE ARAB DEBT TO JUNDISHAPUR

Although the Arabs were mainly interested in the linguistic proficiency of the physicians of Jundishapur and in the ancient documents that they had preserved, the Arabs also valued several other features of the famous Persian medical school. The hospital at Jundishapur was widely admired, and Bagdad's first hospital, which was established in the ninth century, was closely modelled on it. Christians and Jews were called upon to provide the staff of the new institution, and even the Arabic word for hospital was derived from the Persian.

The dispensary at Jundishapur hospital had great influence on Arabic pharmacy, and the Arabs were made acquainted with apothecaries' shops through the Nestorians. In the middle of the ninth century Sabur ibn Sahl of the Jundishapur hospital wrote an exhaustive formulary, which was the first to be adopted as the official pharmacopeia of the caliphate, and remained popular for three centuries in the hospitals and drugstores of Bagdad and Persia. In the names given to many pharmaceutical preparations of later days, such as Messianic Electuary and Bishops Electuary, we see a survival of the time when Arabic medical education was in the hands of Christian teachers.

The medical school at Jundishapur was the first to require students to pass an examination before they received a certificate to practise. This system was adopted in the Arabic schools in the late tenth century. During Arabic times the school at Jundishapur also required that the prospective student pass an examination before being allowed to matriculate. Perhaps, also, the Arabic tradition that the physician must be a thoroughly learned man as well as a competent medical authority can be traced back to the Nestorians, whose teachers of medicine were also savants well-versed in botany, chemistry, zoology, philology, and philosophy.

By the end of the ninth century so many of the teachers of Jundishapur had gravitated to Bagdad to seek wealth and glory at the capital of the caliphate that the medical school was rapidly declining. The schools of Bagdad, clustered around the mosques of the great city, now flourished, and the importance of Jundishapur had so waned that after the end of the tenth century we hear of the school no

more. But Jundishapur had already played its role in nurturing the early period of the Arabic Renaissance and only left the stage when a new point in the development of Arabic medicine was reached. At the close of the ninth century the tremendous task of creating Arabic versions of Greek medical works had been completed. The Arabic world at this time had usable, and in some cases very good, translations of the entire Greek scientific literature in which it was interested. Consequently, translations were making way for commentaries and for a less restricted use of accumulated knowledge. The great Rhazes was now writing, and the Arabic Renaissance was reaching its maturity.

Rhazes was a Moslem and the first to use the translated literature as the basis for important original thought which enriched the art of medicine. With Rhazes and later with Avicenna, who was educated by a Nestorian physician, Arabic medicine was primarily in the hands of Moslems and was deriving principles of practice from Arabic translations of the classical authors. The absolute dependence of the Moslem authors, however, on the authority of the ancients during the flourishing period of the Arabic renaissance in the tenth and eleventh centuries is reflected in the following quotation from Rhazes: "A thousand physicians for probably a thousand years have labored on the improvement of medicine; he who reads their writings with assiduity and reflection discovers in a short life more than if he should actually run after the sick for a thousand years."

THE EAST AND THE WEST

Even in the thirteenth century an historian wrote that he had passed the site of the town of Jundishapur many times but not a trace remained of its former grandeur. Now the once famous international medical center is represented by an insignificant village in South Persia. A remnant of adherents to Nestorianism still remain, however, in Turkey and Persia, and they constitute the oldest existing schismatical church in the world. Their numbers have dwindled to about 100,000, but they can look back on their history with a warrantable pride. It was their achievement to have preserved the traditions of ancient Greece in their excellent schools between the fifth and the tenth centuries, at a time when the West had dispensed with classical science as irrelevant to the canonical writings and looked primarily to faith and divine pity for the relief of the sick.

The immense importance of the Nestorian school at Jundishapur lies in the practical instruction in medicine imparted to its students and in the translation and conservation of ancient medical writings. This school was thus the instrument by which Greek medicine was introduced into Bagdad, whence it spread throughout all Islam and finally was infused into the stream of Western medical development in the late Middle Ages. Thus Arabic medicine, born at Jundishapur, had been taken from the West and, after several centuries of cultivation in the Orient, was returned to the West. In recognizing the significance of the medical school at Jundishapur we are acknowledging one of the main cultural links in history between East and West.

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Editorial

By EDWARD B. KRUMBHAAR, M.D.

Eighteen years ago, W. B. McDaniel, 2nd, took over the Editorship of our *Transactions* and now has handed it on to Mr. William K. Beatty, who has produced this June number. I have prepared this appreciation of McDaniel's long and efficient service to the College at the request of the Publication Committee, as one who had been in close contact with him throughout his connection with the College.

McDaniel became Editor four years after he was brought here as Librarian in 1933 at a time when drastic changes in the publication of medical journals and transactions had already begun. As the vicissitudes that this trend produced in our *Transactions* have recently been assembled, by Mr. McDaniel, and published as an editorial in the April number, the last one edited by him, they need not be repeated here. Before McDaniel's regime the annually appearing bound volumes had been edited by Fellows of the College such as Crozer Griffith, H. R. M. Landis, J. H. Austin, T. Fitzhugh. In addition to a more frequent appearance and a change of title to one of broader scope as early signs of change, the present double columns and larger page were adopted, beginning with Volume 8. This was stimulated by several scientific optical studies demonstrating the greater readability and lessened reader's fatigue with this format. Not long ago, when high class "copy" was unusually scarce, it was proposed in Council that summaries only be published. Fortunately such a retrograde step got no further.

McDaniel's high standard of accuracy has led him cheerfully to check all galley proofs himself and, unjustifiably, to feel chagrined if an error of even a single letter had escaped him. One has to have been an editor to realize how much labor this one detail involves—especially when a financial situation does not allow the use of an editorial secretary. For a conscientious editor, another difficulty arose from the very small overlap of supply over demand. Whereas for most medical journals the volume of manuscripts offered greatly exceeds the available space, here this was by no means the case, each number practically exhausting the supply on hand. In fact, the Editor, to be sure, one of the most modest and courteous of men, has confessed that about his biggest headache was to get from visiting lecturers the manuscript that had been arranged for when the lectureship was awarded. It is earnestly to be hoped for the welfare of the *Transactions* and for the peace of mind of future Editors that ways can be found to solve this difficulty, even if it involves "getting tough" by the College officials in an occasional case. McDaniel tells me that he has always had the whole hearted backing of his Publication Committee, but its personnel changes frequently, and in any case the work and much of the responsibility cannot properly be laid at their door. One has only to make a brief comparison to see how much superior the *Transactions & Studies* of recent years are to those of the earlier series. And this has its practical side as well. Not only does it place our College in a more favorable light before the medical world, but it also brings to the Library 233 periodicals in exchange.

Of a Boston family and a graduate of Boston Latin School (1916) and Harvard College (1920), W. B. McDaniel, 2nd, at once began teaching in the English Department at the University of Pennsylvania, presumably influenced by his uncle W. B. McDaniel, an eminent Latin scholar and writer in that institution. From teaching Latin at New York University, he came to us experienced in two basically important fields, following Mr. Fisher, one of the most eminent medical librarians of his day, but one whose 19th century aims and activities were becoming increasingly

outdated. Without specialized training in librarianship, McDaniel had such a sound basis in the humanities that a loftier spirit soon became noticeable in his staff and in the users of our Library. His is not the only instance where the requisite technical knowledge was found to be more easily acquired than the more important qualities that are developed by a sound general education, coupled with intellectual capacity and a good sense of humor.

The publication of the *Transactions* and the conduct of the Library are so closely interwoven that it seems appropriate to mention some signs of the Library's growth during McDaniel's incumbency. Compared to the 291 volumes in the Libarary in 1836, the College's forty-ninth year, and the 81,018 volumes when we moved into our present building in 1909, we now have 186,852 accessioned items and 512,462 non-accessioned (the modern way of estimating size) and on this criterion—a poor estimate of value, to be sure, we rank among the 4 or 5 leading medical libraries of the country. More important is the spirit of courteous helpfulness, extending from the Librarian to the newest page,—gone are the days when a Fellow might be brusquely ordered off a leather sofa for fear of cracking its surface. In short, the Library continues, in spite of the ever-increasing cost of living and tremendous expansion of medical literature, adequately to discharge the 3 duties of a first class library: to provide (from its own or borrowed sources) any publication in medicine and its related fields; to help the seeker toward finding his material, and reproducing it when found; and to act as a repository for medical rariora. The times unfortunately no longer permit additions to this repository through the Rare Book Fund, though in the spirit of William Osler, occasional gems are procured through private donors. One may truly say that throughout McDaniel's incumbency, our Library has maintained its honorable position among the great medical libraries of the world.

When he was retired as Librarian in 1953 after repeated requests because of the drain on his physical condition, a new position was created for him—the Curatorship of the Historical Section. In this congenial task—he claimed to be a "lousy" executive anyhow, his marked talent for historical research will be combined with his ability to write with felicitous and artistic phraseology, with resultant benefit to the College as well as for his own satisfaction. Already, I am told, he is planning to renew, still in the form of mimeographed sheets, the charming Fugitive Leaves, which for a few years accompanied the New Accessions lists that go each month to our Fellows. We may hope that this fortunate combination of the man and the job may long continue.

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Transplantation of Tissues[1]

By CAPTAIN ROBERT B. BROWN,[2] MC, USN

INTRODUCTION

THE privilege of giving this Mary Scott Newbold Lecture on the subject of Transplantation of Tissues is one for which I am deeply grateful. At the same time I have been, and continue to be, appalled at my temerity in accepting an invitation to speak on a subject so broad in its concepts. Fortunately, the very wideness of its boundaries will allow me to maneuver freely and swiftly through and, to large extent, around a great mass of controversial data in genetics, immunology, biophysics, and biochemistry to the more practical aspects of the subject. This statement in no sense implies that extensive research which is being carried on today in these basic sciences is not essential to the ultimate solution of many problems in the field of tissue transplantation. Nothing could be further from the truth.

It is my plan first to state the major problems which confront the clinician in respect to tissue transplantation and to discuss them in general terms. I would like then to consider in more detail specific tissues with which we at the Naval Medical Center have had experience in regard to preservation and transplantation. In presenting these data I speak for the medical officers in charge of the Tissue Bank at the Medical School, those at the Research Institute who have performed the animal experimentation, members of the various clinical services at the Hospital, and several civilian collaborators, all of whom have contributed to our tissue transplantation project. Credits are properly documented in the bibliography of the manuscript.

Part I

Perhaps it oversimplifies the situation to state that the problems to be solved before tissue transplantation can be carried out clinically on a large scale may be separated into two main categories:

1. Problems concerned with establishing an adequate source of supply of acceptable tissues and organs.

2. Problems dealing with preservation (and transportation) of these tissues.

It is firmly believed that the surgical skill and techniques for transplantation will keep pace with the availability of suitable grafts

[1] Mary Scott Newbold Lecture LXXI, College of Physicians of Philadelphia, 6 April 1955.

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and that their development does not constitute a separate problem.

TISSUE SUPPLY AND THE HOMOGRAFT REACTION

The homograft reaction is intimately linked to the problem of supply in respect to tissues for transplantation. If autogenous tissues were but available in all categories as they are to limited extent in regard to skin, bone, cartilage, and fascia, the problem of the homograft reaction would be a less critical one.

Several theories have been advanced to explain the homograft reaction. None has been completely substantiated. The following is a characterization of the reaction:

1. It is evidenced by destruction or replacement of graft tissue by host tissue after an initial period of survival of the graft. The histological picture is that of vascular thrombosis and necrosis (1, 2, 3, 4) with round cell infiltration (1, 5, 4).

2. The reaction occurs when tissues are transplanted from one individual of a species to another unless the two are very closely related genetically, as with monozygotic twins (6, 7, 8).

3. The capacity of the host to react is systemic rather than local (1, 9).

4. There apparently is a dosage effect, in that the speed of development of the homograft reaction varies directly with the size of the graft (1, 13).

5. Once the reaction has been established a second set of grafts from the same donor will provoke an accelerated reaction (1, 10, 5, 11, 12). This has been termed the "second set" phenomenon (1).

6. Finally, the latent period between grafting and evidence of reaction is in the time range known to be necessary for the formation of antibodies in response to some of the common antigenic stimuli (14).

With these facts before us it is understandable why it is the consensus that the resistance of the host to the transplantation of homogenous tissues is due to an actively acquired immunity. However, final proof of this hypothesis has always been lacking in that no specific antibodies against a homograft have ever been identified.

What are some of the factors or maneuvers which have been found to abolish, or at least attenuate, the homograft reaction? For convenience they may be divided into two groups:

1. Those relating to the graft.

2. Those dealing with an altered reaction on the part of the host.

In the first category may be listed the following:

1. Age of the tissue to be transplanted.

2. Treatment of the graft with a view to reducing its incompatibility:

   (a) Chemical.

   (b) Thermal.

   (c) Physical—irradiation.

3. Culture of the tissue to be grafted in adaptive media.

In some instances embryonic or new born tissues may be homografted successfully when the same adult tissues will fail (15, 16, 17, 18). Apparently these relatively immature tissues have not yet developed a degree of individuality or specificity great enough to induce a destructive reaction.

Attempts have been made to reduce the incompatibility of grafts by treating them with various chemicals (19, 20, 21), by heating (21), by freezing (3) or by freeze-drying (22, 3, 23). Although possible tissue antigens may be denatured or leached out (22), such treatment in most instances results in devitalization of the graft itself. Irradiation of donor skin for homografting in animals has increased survival of the graft (24) but not uniformly so (13).

Several investigators (17, 25) have cultured explants of tissue for grafting and attempted to adapt the tissue to the recipient by including plasma or serum from the latter in the culture medium. This technique may have contributed to Gaillard's (17) success in transplanting parathyroid tissue for parathyroid insufficiency in humans.

Among those factors or procedures which alter the homograft reaction by operating through the host are:

1. Degree of vascularization of the graft by the host (26, 27, 28, 29, 30).
2. Cortisone administered systemically (1, 16, 27, 31, 32, 33).
3. Total body irradiation (13, 24, 34).
4. Nitrogen mustard therapy (35, 32).
5. Splenectomy (36, 32).
6. Anticoagulant therapy (37).
7. Agammaglobulinemia (38).
8. Production of an "actively acquired tolerance" (1, 39, 40).
9. "Desensitization" (41) or "immunoparalysis" (42, 43).

One of the explanations that has been advanced for the apparent absence or mildness of the homograft reaction to transplanted cornea or cartilage has been the lack of vascularization of these tissues (26, 27, 28, 29). The survival of homografted tissues implanted experimentally in the anterior chamber of the eye has been explained by some (26, 28) on the same basis. However, Green's (44) contributions on vascularization of homografts are in disagreement on this point.

Cortisone, total body irradiation, nitrogen mustards, splenectomy, and anticoagulants, all have been found to prolong the survival of skin homografts in experimental animals. Anticoagulants were used to prevent, or delay, the vascular thrombosis associated with the homograft reaction. These other modalities have shown, under varying experimental conditions, the common characteristic of depressing antibody formation or otherwise interfering with the immune mechanism (45, 46, 47, 48). Agammaglobulinemia, a state known to be associated with antibody deficiency, has been identified with a successful skin homograft in one human case (38).

Medawar and his group (1, 40) injected chick, mice and rabbit embryos with homogenous cell suspensions and found that the subjects after birth had an "actively acquired tolerance" to skin homografts from the cell donor. Other investigators (41, 43) have reported prolongation of the survival of skin homografts in animals by injecting them after birth but prior to grafting with donor skin antigens. This effect they ascribe to "desensitization" or "immunological paralysis", the latter a concept of Felton (49). Billingham and Medawar (50) were unable to confirm this "desensitization" effect in rabbits.

It must be quite apparent that many of the maneuvers which have been shown to alter the host reaction to homografts in the experimental animal have little to offer clinically. It is very doubtful that one would be justified in doing a splenectomy in a seriously burned patient in order to increase the period of survival of a skin homograft. At the same time one would hesitate to use, in a critically ill patient, large doses of nitrogen mustard or some of the other chemotherapeutic agents that have been shown experimentally to prolong the survival of homografts. It has been estimated (13) that, if total body x-radiation, which has significantly increased survival of skin homografts in mice, were applied to humans in corresponding dosage, it would be fatal in about 50 per cent of cases. Tampering with the human foetus to produce an "actively acquired tolerance" to the tissue of one specific donor does not suggest itself as a very practical procedure.

What, then, is the current status of homografting at the clinical level? Whether a given tissue may be transplanted successfully will depend to great extent upon the essentiality of cell survival and reproduction to a good functional result. Longmire (16) classifies homografts as homostatic or homovital on this basis. The homostatic grafts are inert tissues for which cell survival has not been proven to be necessary or, in some instances, even desirable (3, 23) for their mechanical function. Bone, cartilage, fascia, dura and blood vessels are examples of homostatic grafts and when they are transplanted in a non-viable state they might better be referred to as implants. Homostatic grafts, or at least their functional proper-

ties, may be influenced little or none by the homograft reaction and, therefore, can be used clinically, within limits, with a gratifying degree of success.

The situation with homovital grafts on the other hand is entirely different. Although homotransplantation of various endocrine tissues has been accomplished in the experimental animal with some regularity (51, 52), the same can not be said for the human. Isolated clinical successes have been reported in the treatment of various endocrine deficiencies (53, 25, 54, 55) and Gaillard (17) has had some consistency of functional survival of foetal parathyroid tissue grafted into patients with parathyroid insufficiency. The temporary survival of skin homografts has limited therapeutic significance. Noteworthy as these exceptions may be, it still can be stated emphatically that failure is the rule for homovital grafts in humans. (Blood transfusions may be considered homovital grafts by some but are not included as such in this presentation.)

Solution of the homograft reaction problem, important as it may be to tissue transplantation, might not in itself solve the problem of supply in all categories. This probability has been brought to our attention most forcibly in procuring arteries for grafting. It has been impossible to meet the demand for blood vessels on the basis of those obtained at sterile postmortems in our Tissue Bank. However, Cathode ray (56) or chemical (19, 57, 58) sterilization of vessels taken at routine autopsies has increased the supply and plastic vascular prostheses may cut down the demand for arterial homografts. Little mention has been, or will be made, of heterografts in this presentation but it is not beyond the realm of possibility that our knowledge and control of tissue incompatibility will advance to the stage where heterografts may be made acceptable for transplantation into humans.

PRESERVATION OF TISSUES

Not only must we have an adequate source of supply of acceptable tissues for transplantation but we must have means of preserving and transporting these tissues to make them available at the time and place of demand. Generally speaking methods of tissue preservation may be divided as follows:

1. Preservation in the living state in moist atmosphere, electrolyte solutions, or nutrient media at low temperatures above freezing.
2. Preservation either in the viable or non-viable state by freezing.
3. Preservation in the non-viable state by freeze-drying, autoclaving, boiling, or fixing with chemicals.

Practically every tissue that has been amenable to transplantation in the fresh state has been grafted successfully after short periods of preservation by the first method. The relatively rapid deterioration of grafts preserved in this fashion is its greatest drawback and the resultant waste of tissues already in short supply is intolerable. However, other faults make the method far from ideal. These include the time, expense, and personnel involved in maintaining sterility, relatively constant temperature, and in preventing or correcting harmful changes in the surrounding medium. The necessity for transportation of grafts compounds the difficulties encountered in regulating these environmental factors. In spite of all this, for at least one tissue of clinical importance for transplantation, namely cornea, the first method remains the method of choice.

To date, from the clinical standpoint, freezing has enjoyed its greatest popularity for the preservation of bone and blood vessels, transplants for which cell survival is not essential to functional success. With the study of cell survival following preservation in the frozen state the importance of technical details was pointed up. The concept of thermal shock has been advanced to explain an adverse effect on tissues of sudden cooling to subnormal levels, even in the range above freezing (59). The rate of cooling, the degree of cooling, and the speed of rewarming have been found to influence profoundly the survival of many different tissues (60, 61, 51, 52) and the data available indicate a considerable variance in respect to each.

The discovery by Polge and co-workers (62) that glycerol would protect spermatozoa against the previously observed lethal effects of freezing and rewarming has lent a tremendous impetus to the further investigation of the freezing method for the preservation of tissues for transplantation in a viable state (60, 61, 51, 52, 63, 64). A discussion of the theories advanced to explain this action of glycerol (60, 65, 61, 66) involves an understanding of biophysics and chemistry in respect to salt buffering, bound water, eutectic points, rate and size of crystallization, vitrification and other factors which is beyond the capacity of the speaker and the scope of this presentation. Freezing as a method for preserving tissues for transplantation is subject to the same limitations in respect to temperature control and graft transportation as the nutrient medium method.

Freeze-drying has been our choice for preserving several of the tissues used as homostatic grafts. At this point let me emphasize that freeze-dried tissues are dead. There is no evidence that mammalian cells of any type have survived freezing and drying to a content of residual water less than 10 per cent (67). Freeze-drying as carried on in our Tissue Bank is a modification of the process of "lyophilization", so named by Reichel (68) and adapted by Flosdorf and Mudd (69) to the preservation of serum and other biological substances on a commercial scale. In fact Dr. Flosdorf was consulted at the time the freeze-drying unit in our Tissue Bank was established (70). For those of you who are not familiar with the procedure, it consists of freezing tissues and drying them from the frozen state under high vacuum. The tissues are then vacuum sealed in suitable containers and are stored at room temperature. The upper limits of storage time have not been established but arteries and bone have been grafted successfully after two years of shelf life. The freeze-dried tissues usually are reconstituted in saline or water prior to grafting but ground bone may be implanted in the dried state to be reconstituted in the recipient's own tissue fluids.

In comparison with chemical fixation or freezing of tissues for preservation in a nonviable state, freeze-drying is more expensive and somewhat more involved in respect to processing. On the other hand storage is greatly simplified. It does not require the supervision of trained personnel in respect to controlled conditions of temperature, storage media, and sterility. In respect to transportation, the grafts are handled just as a bottle of dried blood plasma and may be shipped by commercial carrier to any point in the world.

Part II

Having presented in general terms the problems which confront the clinician in the field of tissue transplantation, a more detailed discussion of specific types of grafts would seem to be in order. To large extent our experience has been with the so-called homostatic grafts. Exceptions will be apparent as they are presented.

BONE

Bone is given priority in this discussion because the Tissue Bank at the Naval Medical Center was, at its inception, strictly a Bone Bank established in 1949 for the storage of homogenous bone in the frozen state. At this time many such banks were in operation throughout the country and satisfactory clinical experiences with the use of frozen homogenous bone transplants were being reported (71, 72). It was in a search for a method of preservation of bone that would provide even more acceptable tissue for homografting, and simplify storage and handling, that freeze-drying was investigated and adopted for the processing of this (70) and, subsequently, other tissues for transplantation (73, 74).

What is known about the behavior of bone grafts and the clinical demands placed upon them that should provide some basis for choice between the different types available? Whether any bone graft survives as living tissue or whether all die and are replaced by host tissue has been debated for many decades. Strictly speaking, it probably can be said that no one

has produced conclusive evidence that the cells of any graft of normal adult humar bone survive, reproduce, and continue osteogenic function. On the other hand a wealth of experimental evidence has been gathered from the study of fresh autogenous grafts in ectopic sites (anterior chamber of the eye, muscle, subcutaneous region) (75, 76, 77, 78, 79, 80) to support strongly the contention that some of the cells of this type of graft do survive and participate in osteogenesis. In general, other types of bone grafts show less evidence of cell survival and function (76, 77, 78).

Unfortunately, these observations on the behavior of bone grafts in ectopic sites do not solve the problem of choosing the best type of graft for clinical use where, by and large, the graft will be placed within, or in juxtaposition to, reactive host bone. The fact that some of the cells in an autogenous graft may survive transplantation does not imply that these cells will participate significantly in new bone formation and repair under these latter circumstances. Here, a variety of bone grafts, dead or alive, apparently have the ability to stimulate osteogenesis on the part of the host (76, 78, 81, 82, 80) and to participate in ossification. The factors governing this latter characteristic of bone grafts are poorly defined and it is quite unlikely that they will be better clarified until the basic mechanisms of new bone formation, per se, are understood.

Freeze-dried bone was evaluated as cortical inlay grafts in the radius of dogs (83). These grafts were compared to fresh autogenous and frozen homogenous transplants. The results indicated that frozen and freeze-dried homogenous grafts healed in a manner similar to autogenous grafts, but at a slower rate in the earlier phases.

Nearly 700 deposits of freeze-dried bone have been released by the Tissue Bank for clinical use. Our orthopedists have reported their experience with these bone grafts in a series of 125 patients treated at the Naval Medical Center (84). Altogether there were 15 clinical failures in the 99 cases adequately followed after operation. Six can be attributed to technique. In only nine of these can the graft be incriminated, giving a rate of graft failure of 9.7 per cent.

The results with freeze-dried homografts compare favorably with those reported for bone preserved by other methods (85). It is regrettable that there is no like series of autogenous grafts, the results of which can be compared to these just presented. The observation made in the animal experiments that freeze-dried homografts heal at a slower rate than autogenous grafts was not corroborated by clinical impressions. Freeze-dried grafts are used regularly on our Orthopedic Service. Additional incisions are avoided; operative time is shortened; postoperative discomfort is minimized; and an abundant selection of cancellous and cortical graft material is available.

SKIN

We have been interested in evaluating various methods of preserving skin for transplantation (86). Occasionally, there are indications for storage of autogenous skin for subsequent grafting. Any excess of skin removed from a donor site may be saved against the possibility of an inadequate initial take or in the event a grafting procedure must be terminated abruptly before completion. Skin also may be removed from amputated limbs in traumatic cases and stored for delayed coverage of the stump or other denuded sites. Homogenous skin is preserved for clinical use as a temporary dressing, particularly in extensive burns (6, 87, 16), and for experimental purposes.

At first, skin in our Tissue Bank was preserved by placing it in a nutrient solution consisting of 10 per cent pooled human serum and 90 per cent of buffered, balanced salt solution (Earle's) and refrigerated at 3°C (73). Autogenous skin preserved in this manner has been grafted with permanent survival after storage of 84 days. Homogenous grafts which have been stored for as long as 185 days have been used for temporary dressings and have behaved as fresh homografts.

Inevitably, of course, freeze-drying was applied to skin. This skin has been used as a

dressing on several severe burn cases in our own institution and by civilian collaborators (including Dr. Henry Royster of this city). Initially these grafts adhere firmly to the underlying host bed, are clinically indistinguishable from living auto- or homografts, and apparently do contribute to the patient's general welfare by providing coverage of the open burn surfaces, decreasing plasma and electrolyte loss, and relieving pain. They slough and separate from their bed after varying lengths of time which are, on the average, less than for viable homografts.

Recently our studies in skin preservation were extended to include freezing in glycerol-saline solution. Homografts of human skin preserved for as long as 41 days in this fashion have been used as temporary dressings for burns with survival comparable to that of fresh homografts. An evaluation of this skin by grafting after longer periods of storage in our Tissue Bank must await the passage of time.

Altogether 580 deposits of skin have been withdrawn from the Tissue Bank for clinical use. As to preservation these have been fairly evenly divided between the three methods discussed. More data correlating initial biological acceptance, survival times, and periods of storage must be accumulated for a comparative evaluation of these methods. (Case presentation with slides.)

Probably the most intriguing study involving skin is one which is being carried on with the collaboration of Drs. Earle and Evans of the National Institutes of Health (139). It is known that suspensions of epithelial cells will grow and produce stratified squamous epithelium when applied autogenously to denuded areas in animals (88). On the other hand sheets of epithelial cells applied homogenously will fail (89). Morphologic dedifferentiation of cells in tissue culture is commonly observed and it is hypothesized that this morphologic reversion toward the embryonic state may be accompanied by a corresponding loss of the adult specificity associated with a homograft reaction. Reasoning thus, a project was set up to culture human epithelium over relatively long periods of time with the hope of obtaining "despecified" material suitable for clinical homografting.

Using the tissue culture techniques developed by Dr. Earle and his associates an abundant growth of cells was obtained from whole skin explants. This material was subjected to a limited clinical trial with equivocal results. At this stage there were many reasons for believing that the cells in the culture were predominantly fibroblasts. Efforts have been directed toward obtaining pure cultures of epidermal cells. Considerable progress has been made in this direction with an ultimate solution in sight. At the same time studies are being made to determine the neoplastic potential of these tissue cultures. Obviously, these current phases of the project must be brought to conclusion before further clinical trial is warranted.

BLOOD VESSELS

Vascular replacement, so spectacular a few short years ago, now is rather commonplace. Initial success has been attained in the treatment of a variety of diseases involving major blood vessels but many problems remain to be solved by continued study and research in this field. In general, the lesions which are treated by resection or by-passing and grafting are:

1. Congenital anomalies—notably coarctation of the aorta.
2. Aneurysms of major vessels.
3. Trauma to major vessels.
4. Segmental obliterative disease of major vessels.
5. Malignant involvement of major vessels.

Recognizing that the surgical treatment of these vascular lesions will create vascular defects which will require grafting, the problem then boils down to a selection of the best replacement material available.

Autogenous arterial grafts are rarely available for major vessel repair. There is some evidence that autogenous vein grafts are better than arterial homografts for replacement of medium-sized arteries of the extremities where

good support is afforded by the surrounding tissues of the recipient (90, 91, 92, 93), but this is not conclusive (94, 95).

Turning then from autografts to arterial homografts, let us consider characteristics desirable in the latter. Viability apparently contributes nothing (96, 97, 23). All cellular elements of the graft, dead or alive on implantation, are replaced by the host. Except for the endothelium which may be restored to varying degree, cellular replacement is with fibrous tissue. The elastic fibers, the important element of the grafted tissue, persist with relatively slow change in terms of years.

Certainly the capacity of the graft to grow is desirable when arterial replacement is necessary in infants or children. The evidence at hand would indicate that increase in size commensurate with host vessel growth is not to be expected with either fresh or nutrient media preserved homografts (98, 99, 100). There is no reason to believe that freeze-dried arterial homografts will perform any better in this respect.

Ready availability as to numbers and a variety of sizes and configurations is important. We have not been able to meet this demand in terms of vessels obtained for freeze-drying at sterile postmortem procedures. The ethylene oxide sterilization of grafts obtained at routine autopsies, as advocated by our Cardiovascular Consultant, Dr. Charles Hufnagel (19), has helped to meet the deficiency. However, this sterilizing agent must be used with appreciation of the fact, demonstrated in our laboratories, that overtreatment results in graft damage, recognized both histologically and by an increased incidence of complications (101).

An arterial graft should be relatively easy to implant, technically speaking. There is little, if any, room for choice on this basis between the various preparations in use. Certainly the freeze-dried graft, brittle and deformed in its state of preservation, regains all its normal physical characteristics on reconstitution prior to implantation.

Finally, an arterial graft to be satisfactory should perform its function with a minimum of complications. Freeze-dried and fresh homografts in dogs were compared in our laboratory (96, 97) and it was demonstrated that the former were implanted with better functional results, a lower mortality, and a lessened incidence of thrombosis and hemorrhage. Aneurysms did not develop in either type of graft. Calcification of our freeze-dried grafts has not been observed but we do not have the long term follow-ups of those who are reporting calcification in arterial homografts preserved by other methods (102). In respect to calcification it should be noted that its presence, per se, in arterial grafts has not been correlated with any demonstrable functional deterioration of the grafts.

Evaluated in respect to the criteria outlined, freeze-dried homografts appeared to be as good as, if not better than, any of the tissues available for arterial replacement. Nearly three years ago the first freeze-dried arterial graft was used clinically (103). (Case presentations with slides—see Fig. 1.)

The Tissue Bank has furnished a total of 43 freeze-dried arterial homografts for use either at the Naval Medical Center or at other institutions. Admittedly no sweeping conclusions can be drawn from an experience so limited, particularly since follow-up data are not current for all cases. However, certain facts stand out. There are only two proven graft failures among the 23 implanted at our own institution. Both of these failures were due to thrombosis. There has been no mortality in the series.

Evaluated from a functional standpoint, results have been uniformly excellent in the treatment of coarctations, aneurysms, and trauma. They have been less satisfactory in respect to segmental occlusive disease. In spite of what appears to be adequate restoration of blood flow in the major vessels, vascular insufficiency in the part often persists or recurs after initial improvement.

Strengthening impressions gained from our

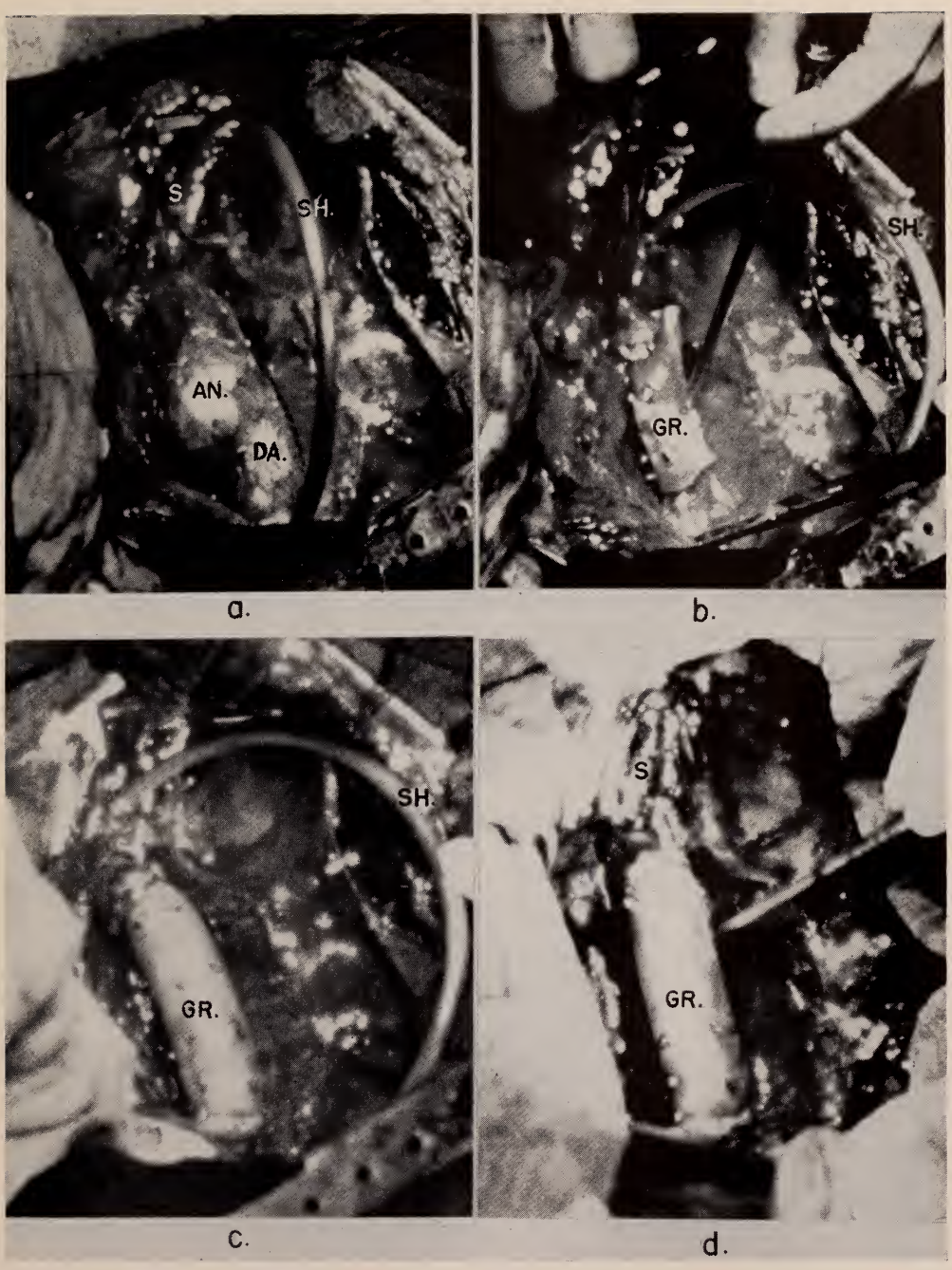

FIG. 1. (a) An aneurysm (AN) of the distal aortic arch. A polyethylene tube shunt (SH) has been established between the left subclavian artery (S) and the descending aorta (DA). (b) The graft (GR) is being fitted to the defect created by resection of the aneurysm and the shunt (SH) is maintaining blood flow in the descending aorta during the period of occlusion. (c) The graft (GR) has been inserted. (d) The shunt has been taken down. The continuity of the divided left subclavian artery (S) has been restored by end-to-end anastomosis and the opening in the side of the distal aorta has been closed.

own experience in arterial grafting by reports from others, we would summarize current status as follows:

1. Arterial grafting can be accomplished successfully and with low mortality in the treatment of coarctations of the aorta (104, 105), aneurysms (106), segmental occlusions (57, 94, 107, 108), trauma (109, 110), and malignant involvement (111) of major vessels.

2. Arterial grafting has not produced uniformly good results in the treatment of segmental occlusive disease (95, 112, 108). The difficulty of accurately determining the extent of the disease preoperatively and the tendency to progression of the disease make this understandable. The high incidence of segmental disease in the femoral arteries (57, 94) also contributes to unsatisfactory results in a manner which will be brought out in the next point.

3. It has been demonstrated both in the experimental animal and clinically that arterial replacement in the smaller vessels (carotids, femorals, popliteals) is much less likely to succeed than that of larger vessels (aorta and iliacs) (19, 113, 114). This is particularly true in respect to late thrombosis in long grafts (95, 112, 92). There is a real need for further study of material and techniques with a view to improving results of vascular replacement in small vessels.

4. Within the limits of their availability freeze-dried homografts appear to be as satisfactory as any material for arterial grafting (103, 115).

5. In the direction of increased availability, freeze-dried or chemically fixed heterografts have achieved some acceptance both in the experimental animal (116, 19, 20) and for clinical use (20, 117) but this is not universal (118, 119). They are not recommended if homografts are available.

6. Although not tissue transplants, vascular prostheses of woven plastic material (vinyon-N, nylon, orlon, etc.) should be mentioned. They have given very promising results in the increasing number of clinical cases in which they have been used (113, 120, 121). (Case presentation with slides) As compared to homografts their unlimited supply, durability, and simplicity of sterilization recommend them most highly. On the other hand, they require more exacting technique for insertion and may present difficulties in respect to bifurcations, flexion points, and proper tension to avoid buckling and wrinkling (122, 120, 121). On the theoretical side the possible role of some of the plastics as carcinogens can not be completely disregarded (123).

CARTILAGE

The current status of transplantation of cartilage at the clinical level was summarized by Gibson (124) who states, "Whether autogenous, homologous, or heterologous, alive or dead, the long term results of cartilage implants are unpredictable and frequently disappointing. There is a need for reconsideration of the clinical worth of cartilage implants."

Both freeze-dried and merthiolate-preserved costrochondral cartilage are available in the Tissue Bank for homografting. A total of 69 specimens has been released for clinical use. However, no analytical study of these cases has been made to date.

On the experimental side, the oral surgeons (125) at the Dental School have used freeze-dried cartilage to build up the edentulous alveolar ridge in dogs. Osteogenesis occurs and the grafts are replaced by living bone. Cartilage was better for this purpose than was freeze-dried bone. Freeze-dried cartilage has been used successfully for alveolar ridge reconstruction in a few human cases.

CORNEA

Unlike the other members of the homostatic group with which it is classed (16), corneal tissue which is known to be dead can not be transplanted with more than an isolated success (126, 127). On the other hand it has never been established whether the stromal cells in a fresh homograft persist indefinitely after transplantation or whether they die and are replaced by host stromal cells. The available evidence favors the latter (126, 27).

We are not prepared to discuss the indications for corneal grafting or the criteria of operative success. Our primary interest has been in improving on the methods currently in use for preservation of corneas which include immersion in oil or suspension in a moist atmosphere at temperatures slightly above 0°C. With these methods of storage the corneal tissue rapidly becomes unsuitable for grafting and must be discarded in a few days if not used (128, 127, 129, 130).

Freeze-drying was not utilized to preserve corneal tissue for two reasons. First, it would result in a completely devitalized graft and second, it had already been tried unsuccessfully by Leopold and Adler (130). Recently Eastcott and associates (131) have reported successful clinical grafting of corneas which were preserved by freezing in glycerol-saline solution. Results were uniformly good for 5 lamellar transplants but there were 2 failures in 7 full-thickness grafts. At present preservation of human, dog and rabbit corneas by freezing in glycerol-saline is under investigation at our institution (132).

FASCIA

Fascia has been preserved by freeze-drying and used both experimentally and clinically. Freeze-dried homogenous anterior rectus sheath was implanted in dogs with good results in the repair of large abdominal wall defects (22). Clinically, freeze-dried fascia has been used successfully by the orthopedists in the treatment of synostoses, in the replacement of an orbicular ligament of the radius, and in the repair of an acromioclavicular separation (133). (Case presentation with slides)

FIG. 2. The dog's extensor digitorum communis tendon (T) has been retracted to show, between the arrows, the smooth, glistening internal surface of the sheathing freeze-dried artery.

TENDONS

Freeze-dried arteries have been used experimentally to form a protective sheath around injured tendons in dogs (134). The controls showed dense adhesions between the abraded and partially divided tendons and surrounding structures. In the dogs whose traumatized tendons were wrapped in a freeze-dried artery, adhesions grew from the surrounding tissues into the arterial sheath but did not form between the intima and the tendon (Fig. 2). The animal experiment has just been completed. The results would appear to justify a clinical trial of the method.

DURA

A phenomenon similar to that observed for tendon sheathing with artery was observed in experiments with freeze-dried dura (135). Fibroblastic replacement of the graft occurred from the overlying temporal muscle but no adhesions were formed between the freeze-dried tissue and the underlying brain.

Freeze-dried dura has been used clinically in 3 cases on the neurosurgical service (136). Cerebrospinal rhinorrhea following trauma was successfully treated in two patients by operative closure of the defect by freeze-dried dura. A third patient in whom the preserved dura was used to contain a herniating brain died before any evaluation of the graft could be made.

MISCELLANEOUS TISSUES

Attempts to replace segments of oesophagus, bile ducts, and ureters with freeze-dried arteries in experimental animals have been uniformly unsuccessful (22). These results might have been postulated since it is hardly reasonable to expect devitalized freeze-dried tissues to tolerate the bacterial contamination and chemical digestion or irritation to which they are subjected at these sites.

Weiss (137, 138) studied freeze-dried homogenous nerve grafts in rats, cats and monkeys and found that full functional recovery may be obtained after bridging a gap of several centimeters with these grafts. Although peripheral nerve segments have been freeze-dried and stored in the Tissue Bank we have been reluctant to use these grafts in patients because of the uniformly poor results which have attended all types of major nerve homografting in humans (16, 3).

CONCLUSION

In conclusion, I would direct your attention to Fig. 3. This is a summary sheet with a breakdown showing by tissue categories the number of deposits withdrawn from the Tissue Bank prior to January 1, 1955. A total of 1371 grafts has been used in 605 patients. The geographical points to which grafts have been distributed on request are indicated in Fig. 4 and will testify to the ready transportability of these tissues in their preserved state.

These data are presented by our group, not with a feeling of a task completed but with humbleness engendered by the firm conviction that the field of tissue banking and transplantation has just been entered. If we predict a solution to the problem of the homograft reaction and envision tissues and organs for

TISSUE BANK

DEPOSITS WITHDRAWN FOR CLINICAL USE

	NAVAL MEDICAL CENTER	OTHER INSTITUTIONS MILITARY	OTHER INSTITUTIONS CIVILIAN
BONE	399	56	217
ARTERY	27	3	13
CARTILAGE	64	2	3
SKIN	466	11	103
FASCIA	3	0	0
DURA	4	0	0
TOTALS	963	72	336

1371 GRAFTS IN 605 PATIENTS

Fig. 3. Tissue Bank Report—January 1, 1955.

Fig. 4. Geographical points of distribution of grafts from the Tissue Bank.

grafting being grown abundantly in artificial culture media, the possibilities in the field become infinite.

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Approaches to the Chemotherapy of Cancer[1]

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IT IS with deep appreciation that I accept the Nathan Lewis Hatfield Prize and Lectureship of the College of Physicians of Philadelphia which gives me the privilege of discussing with you tonight a subject of current importance. The title "Approaches to the Chemotherapy of Cancer" I have selected with care, for I mean to convey that chemotherapy of cancer is today an actuality, even though the beneficial effects are only of temporary value. I should like to suggest further that through the study of the approaches to this problem the possibilities for much more rapid progress may be realized.

We shall use the term *chemotherapy* broadly to include the action not only of chemical substances but also of hormones and of antibiotics on cancer in the experimental animal and in man. Our discussion this evening, however, will make only passing reference to the action of hormones, such as the estrogens and the androgens. Knowledge obtained from many disciplines and institutions throughout the world for centuries forms the background of the history of chemotherapy of cancer. It is only within the last ten years, however, that chemicals have been used in the treatment of disseminated cancer in man in a manner effectively enough to mark the beginning of a new era in the history of cancer research. In our preoccupation with the application of the results of laboratory research to the treatment of cancer in man we must not forget that thousands of patients have been cured by the use of the techniques of the surgeon and the radiologist. We may expect with more widespread use of the cytologic techniques now available that this number will be increased to an impressive degree. Nor may we forget that when diagnostic tests for cancer become available to permit the early and accurate recognition of the presence of any one of the many different forms of cancer affecting man, greater therapeutic efficacy will be accomplished by the use of those methods already of proved value in the treatment of certain types of cancer in man. It is an unfortunate fact today that 50 to 75% of patients with malignant tumors are not cured. The figures vary in different clinics in different parts of the country. The reason for failure is found in the disseminative nature of certain of these tumors, such as the leukemias, lymphomas, and Hodgkin's disease which are too widespread from the very beginning to permit cure by surgical removal. It is unfortunate too, that many forms of cancer have already metastasized before any evidence of the presence of a primary tumor can be recognized. Small wonder then that for centuries there has been the dream of a chemical cure for cancer.

Paracelsus (1493–1541) is credited with having initiated the field of chemotherapy, a science which was founded 400 years later by Paul Ehrlich. Paracelsus spoke of a specific chemical within the cell wherewith to drive out the venoms of a specific disease. Iago Galdston has pointed out that the treatment of disease by means of chemical agents had been incorporated for many years in the implications of the words "*iatro chemistry*" (the science of chemistry applied to medicine). Ehrlich, however, coined the term chemotherapy not to imply that chemistry was to be utilized in the treatment of the disease, but rather in the destruction of the specific disease-producing living agents operative within the body of the diseased patient. As Galdston has phrased it, the aim of Ehrlich's chemotherapy was *inner sterilization.*

[1] Nathan Lewis Hatfield Lecture XXXIX, College of Physicians of Philadelphia, 2 March 1955.

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If we are to seek chemicals to solve the problems of the many forms of cancer affecting man, we might search for *destructive* agents capable of acting upon disseminated cancer throughout the body. Or, looking forward to the time when diagnostic tests will reveal the presence of cancer before it has disseminated widely, or even when it is still restricted to one single tiny primary mass, we might with logic look for a chemical factor, an *enzyme*, or the *biochemical principle* lacking in the cancer cell. Supplying it to the body may then bring about maturation of the neoplastic cell, with transformation thereby of such cancer cells to normal constituents of the body. Could such a transformation be produced by simple replacement of the lacking enzyme or maturation principle to the cancer cell we would then be faced with the second problem of resorbing or remodeling the tumor mass, now composed of mature and presumably normal cells, to conform to the contour and functions of the normal structures of the body. We will discuss this direction of research no further tonight, but would like to leave with you this brief suggestion of what may be regarded as the ideal goal of research in chemotherapy of cancer in man, one which has not been approached by current research.

It is only within the last ten years that the breakthrough in the problem of chemotherapy of man has come—that chemical agents have been used to produce easily demonstrable effects upon large tumor masses or upon numerous metastatic foci scattered throughout the body. For years real progress in this field had been impossible because of the lack of research leads which would permit an entrance into this field. Most scientists and doctors, even until the last few years, have had little faith that such leads would be found. I am reminded of the remarks of Shields Warren at the Second Conference on Folic Acid Antagonists in the Treatment of Leukemia, called by the Children's Cancer Research Foundation in Boston in 1951. He recalled the meeting of the Association for Cancer Research some twenty years before: there was a long series of papers on the production of cancer in mice by carcinogenetic hydrocarbons, and the large lecture hall was crowded with eager listeners and participants. This part of the program was followed by a paper on an attempt to cure disseminated cancer in man. Before the speaker could reach the podium the hall was virtually empty.

A BROAD CLASSIFICATION OF ANTI-CANCER AGENTS

The chemical agents of great interest today in the chemotherapy of cancer in the laboratory or the hospital ward were discovered in a number of different ways and by the use of several different kinds of techniques. They may be grouped in six great classes. We shall say no more about two of these, except to mention the great promise of research programs concerning *plant extracts*, such as podophyllin and its derivatives (alpha and beta peltatin), and *bacterial products* such as the polysaccharides which have been studied so extensively in your Institute of Cancer Research. Both classes of compounds have come from the research programs of Dr. Murray Shear and his colleagues in the National Cancer Institute.

Hormones constitute the third group, the most well studied of which are the estrogens and androgens. It is here that important directions are being followed in the synthesis of analogues of those hormones proved to be of carcinolytic importance in the hope of increasing the carcinolytic potency and decreasing or abolishing the undesirable side effects. The techniques of such a search are exactly those employed in the synthesis and study of analogues of effective chemical carcinolytic agents.

The fourth group consists of *antibiotics*; further discussion will be given concerning two classes of antibiotics currently of interest at least in mouse tumor programs. The fifth and sixth groups contain all of the carcinolytic chemical agents proved to be of interest, either experimentally or against the several forms of cancer in man. These two great groups of chemicals may be divided, for purposes of

classification in light of our present meager knowledge concerning mechanism of action, into those which may be called *cytotoxic agents*, because of their direct action on already formed nucleic acids, and those which may be termed *anti-metabolites*, and which bring about their effect because of inhibition of the synthesis of nucleic acid.

The cytotoxic agents include the nitrogen mustards, the ethylenimines, the disulfonoxyalkanes, the carbamates, and more recently the phenylbutyric acid mustard of Haddow. The term cytotoxic agent, of course, implies only that we have no good explanation for their mode of action. The nitrogen mustards, for example, appear to possess the character of cross-linking protein. Cellular functioning proteins are thus immobilized. They also interfere with cell growth by binding sulfhydryl enzymes. Vital respiratory and oxidative enzymes are thereby blocked leading to inhibition of chemical biocatalytic processes. The radiomimetic effect of the mustards, a characteristic also of the effect of irradiation, has been studied in great detail. The mustards are responsible for depolymerizing desoxyribose nucleic acid producing thereby interference with the structure of the nucleic acids of the chromosomes that are to participate in mitosis.

The class of *anti-metabolites* acting as nucleic acid inhibitors contains two great sub-groups. The first of these acts as antagonists to folic acid or to the citrovorum factor, or to riboflavin, or pyrodoxin. The second of these contains antagonists to purines, pyrimidines, thiamine, amino acids and the like. The search for anti-metabolites represents one major rational approach to the chemotherapy of cancer. Our demonstration in 1948 of the production of remissions in acute leukemia by the use of folic acid antagonists, aminopterin and methotrexate, called attention to the carcinolytic possibilities of antagonists to metabolites (biologically active chemical substances necessary for cell growth) in cancer chemotherapy. In 1857 Pasteur laid the foundation for the concept of biological antagonism when he postulated that a living cell can be inhibited specifically by a definite substance in a selective manner. Anti-metabolites exhibit a structural analogy to a co-factor or tissue precursor. In general they are only moderately reactive chemically. In the case of the most important class of anti-metabolites known today, the folic acid antagonists, their action is essentially to prevent or obstruct the transformation of folic acid to folinic acid (the citrovorum factor) which acts as a co-factor in nucleic acid synthesis. The antagonist to purines and pyrimidines, the best example of which is the purine antagonist 6-mercaptopurine (purinethol) interferes with the synthesis of nucleic acid from preformed purines.

A RATIONAL APPROACH TO CHEMOTHERAPY

We shall not take this occasion to trace the events which led to the discovery of those agents presently of carcinolytic importance. Such a study, however, is of interest for a number of considerations not the least of which is the moderation thereby exercised over some over-enthusiastic and uncritical discussions sometimes heard concerning a rational approach to the chemotherapy of cancer. The use of the "retrospectoscope" properly employed will lead to the interpretation and integration of data of great value for further research. Most of the emphasis in chemotherapy today is on nucleic acid inhibitors. It is obvious that the demonstration of clear qualitative biochemical differences between the nucleic acid metabolism of normal and tumor cells would be of great value. In the absence of such data, however, the approaches which have been used in the discovery of carcinolytic agents, such as the folic acid antagonists and purine antagonists have demonstrated that nucleic acid inhibition, no matter how produced, represents a fruitful direction of further research. The synthesis of compounds, analogous in structure to tissue precursors or co-factors involved in growth, or to substances of already proved carcinolytic value is an approach used by many investigators today, although this is essentially an empirical approach with the empiricism based upon achievement. The

hypothesis upon which interference with the nucleic acid metabolism of the cancer cell is regarded as a good approach in cancer chemotherapy is based upon the premise that selectively acting nucleic acid antagonists will be found. There is no reason, however, for such research to be limited to nucleic acid inhibitors. There are other constituents of the normal or malignant cell in addition to nucleo-proteins. We may mention the lipids, the carbohydrates, and minerals, such as trace elements, phosphates, or calcium. Emphasis may be placed even upon the water content of the cell. It appears equally logical to direct attention to these constituents of the cell as the target for the action of chemicals, hormones, antibiotics, bacterial products, or plant extracts.

OTHER APPROACHES TO THE SEARCH FOR CARCINOLYTIC AGENTS

Attention thus far has been focused on a semirational approach to chemotherapy, particularly on the basis of our knowledge of the mechanism of action of those chemical agents of proved carcinolytic value. It is clear that other approaches, purely empirical in nature are available. We may ask: is such an empirical approach justifiable? Chemical substances synthesized for purposes unrelated to cancer chemotherapy may be found by the thousands in academic and commercial laboratories. It has been estimated that more than one hundred thousand chemical compounds not synthesized by nature have been produced by chemists and it is obvious that there is almost no limit to the number of chemical compounds which can be synthesized. The recent demonstration of the carcinolytic activity of antibiotics, such as puromycin and actinomycin makes mandatory the study of the hundreds and thousands of antibiotics either already or potentially available in the laboratories of the pharmaceutical industry and the few academic institutions with facilities in this field. Such an approach can be only empirical and must be followed by chemical studies designed to identify the active chemical, if possible, in the antibiotic. Only mass empirical study of plant extracts will reveal carcinolytic agents of this character. Such studies are routine, frequently uninspired and difficult to accomplish. Unless the cures for the many different forms of cancer in man can be achieved in the very near future by research, whether rational, empirical, or combined in nature, it appears that there is no avoidance of the responsibility by those concerned with cancer chemotherapy of mass study for possible carcinolytic activity of many kinds of agents, chemical, synthetic, or natural in origin.

SCREENING TECHNIQUES

A special research commission, appointed by the American Cancer Society under the Chairmanship of Dr. Alfred Gellhorn, has just completed a study of the action of 27 chemical compounds in 69 screening systems by a series of investigators in various parts of the country. There is no single screening system available today which will yield complete correlation with the carcinolytic effect of compounds on man. Here is a field where research will be of great importance. Were it possible to discover a simple rapid method which would yield complete correlation with effects on human cancer, progress in the chemotherapy of cancer literally would be catapulted.

For the moment the study of the action of chemical compounds on the already grown mouse tumor implanted in the appropriate mouse is the most valuable single screening method. From our own experience we would recommend that at least three different kinds of leukemia, two different kinds of mammary adenocarcinoma, one kind of sarcoma, at least one kind of malignant melanoma such as the S-91 Cloudman tumor, and preferably two or three other forms of cancer in the mouse be employed regularly in any mouse tumor screening program. Our experience has shown too that microscopic as well as gross observation on these mouse tumors is essential if important leads are not to be overlooked.

Two examples may be given to illustrate one limitation of this method. In the Bar

Harbor P-1534 lymphatic leukemia 6-mercaptopurine, purinethol, and methotrexate, both chemical compounds of great value in the production of remissions in acute leukemia in the child, failed to produce any important degree of gross change, although Actinomycin D (Waksman) caused complete destruction of the tumor in an amount of 75 gamma per kilo of mouse in 8 days of treatment. Microscopic study, however, would have revealed evidences of the carcinolytic activity of the anti-metabolites in this experiment. In another instance, puromycin, the antibiotic and its derivative, an amino-nucleoside, discovered by the research group of the Lederle Laboratories, under Dr. James Williams, was shown by them to have important carcinolytic activity against the mammary adenocarcinoma in the mouse but not in other tumors studied in their broad spectrum. In our own studies this antibiotic had no effect against the Bar Harbor P-1534 and C-1498, lymphatic and myelogenous forms of leukemia, respectively. When tried against the AKR spontaneous leukemia, however, a very striking anti-tumor effect was demonstrated.

Brief reference may be made to experience with other screening methods. Experiments by Mrs. Lily Rudenberg in our laboratories have been concerned with the inhibition of the seedling root of the turnip (Brassica rapa L). Both the folic acid antagonist aminopterin, and the citrovorum antagonist dichlordihydrotriazine (D-54) inhibited markedly the growth of these seedling roots. Such inhibition could be reversed by the addition of the citrovorum factor. This simple screening technique may prove to have only limited value in further studies. A method which has been employed on a large scale in several laboratories including our own microbiological division under Dr. George Foley, concerns microbiological assay systems. Strains of bacteria, or other cell species, which exhibit a specific metabolite requirement for their growth are placed in media which contain all growth factors necessary for maintenance or growth of the cell, except the growth factor to be studied. Methods have been elaborated for the study of all known vitamins and several amino acids under these test conditions. The technique includes the measurement of the growth of the cell or the metabolic response of the cell system to increasing increments of the cell factor under study. The response is found usually as a linear function of concentration. The effect of the inhibitor by titration of the inhibitor with various concentrations of the growth factor is then carried out. This is followed by attempts to reverse the observed inhibition with excess concentrations of the growth factor or its metabolic accessory and end products. The growth response is measured by differences in density of unit volumes of culture (as for example in the per cent of light transmission). This is proportional to the number of cells per unit of volume. Depending upon the nature of the ratio between growth factor and the inhibitor at different concentrations, the inhibition is described as competitive (constant ratio) or non-competitive (non-constant ratio). Inhibitors thus studied are in general chemicals, altered growth factors, or substances with close structural resemblance to a growth factor (anti-metabolites). They may interfere either with the use of the growth factor, the metabolite, or with the activity of a necessary enzyme. This method may be employed on a large scale. In a sample study, metabolites, such as folic acid, dihydro-folic acid, citrovorum factor, riboflavin, thiamine, niacin, para-aminobenzoic acid and the like may be studied and results reported within 2–3 days after receipt of the chemical compound. Such studies give important information concerning the possible mechanism of action of chemical compounds. Their greatest value in a screening program lies in the demonstration of biological activity for a given chemical compound. Further studies against experimentally induced tumors in the mouse or against cancer in man may show no correlation with such microbiological metabolic studies. If this technique does nothing more,

however, than direct attention to biologically interesting materials it has served a useful purpose.

Similar studies against other organisms, such as *Tetrahymena gelii* in vitro and *Toxoplasma gondii*, or Plasmodia in experimental animals, have yielded interesting information concerning biological activity but no close correlation with human carcinolytic activity. It is possible, however, that further examination of the metabolic requirements of such parasites as altered by carcinolytic chemical agents may yield leads which will furnish qualitative biological differences between normal and cancer cells in man.

The accomplishment in recent years of the growth of a few malignant tumors derived from man in the cheek pouch of the Syrian or golden hamster, *Mesocricetus auratus*, and the Chinese or striped-back hamster, *Cricetulus griseus*, previously treated with cortisone or irradiation, and similar accomplishments in the cortisone pretreated rat have led to great interest in the possibilities for the study of carcinolytic agents on human tumors outside the human body. Only a small number of tumors derived from man have been grown in generation after generation under these experimental conditions. This difficulty should serve only as a stimulus for further research. The fact that growth of human cancer in the experimental animal under these conditions has been achieved is representative of important progress. But research has not yet advanced this method to the point of routine screening of carcinolytic agents. Nor has the hope been realized that the chemical agent to be employed in the treatment of a given patient with disseminated cancer will be chosen on the basis of the action of a whole series of carcinolytic chemical compounds against a sample of that patient's tumor grown in a series of hamsters or rats.

The inadequacy of the various screening methods employed in the search for carcinolytic agents must not discourage the use of these methods in research today. Reports summarizing "negative findings" must be evaluated in the light of the screening procedures employed, the breadth of the spectrum if mouse tumors are used, the extent of study, whether microscopic as well as gross in character, and the expertness of the research workers. It is obvious that a screen adequate for one research group may act as a sieve for a less qualified or poorly supervised laboratory.

PHARMACOLOGICAL STUDIES

Before any anti-cancer substance may be used in man, studies concerning its toxicity, metabolic activity, absorption, excretion and site and mechanism of action must be determined under laboratory conditions. The facilities and number of experts presently available for this purpose are painfully inadequate to cope with the needs of cancer chemotherapy.

TOXICITY

All carcinolytic chemical agents of temporary value in man have demonstrated toxic properties which are produced by amounts only slightly above those required for therapeutic action. Skill in the employment of these agents in man can prevent deleterious effects upon the patient. These toxic effects have interfered greatly with the full use of the carcinolytic powers of these agents. Most of the toxic effects are concerned with depression of the bone marrow, alteration of the mucosa of the gastrointestinal tract, and other less important but nevertheless distressing changes. It is encouraging that at least four agents, two synthetic chemical substances and two antibiotics with important carcinolytic effects against certain tumors in the mouse, have been found in our experience recently to have no toxic effects upon the bone marrow. The chemicals are the dihydrotriazines, synthesized by Dr. Edward Modest in our laboratories.

The antibiotics are the puromycin and its derivative the 4-aminonucleoside, discovered by the same group and verified in our program; and Waksman's Actinomycin D, the carcinolytic action of which we have just

demonstrated against the P-1534, and the C-1498 and the AKR leukemia in mice, as well as against S-91 melanoma and the mammary adenocarcinoma in the mouse. These encouraging findings of carcinolytic agents, without bone marrow destroying effects, give promise of more rapid progress in cancer chemotherapy. It is too early to give the results of studies of the effects of these agents on cancer in man, except to state that adequate studies so far have substantiated the lack of bone marrow destroying effects of these four agents.

The best treatment for toxicity produced by any chemical agent used in man is cessation of therapy for several days and sometimes longer. The use of the citrovorum factor, or folic acid, in attempts to overcome the toxicity of methotrexate or aminopterin has no practical value. It is possible to neutralize completely the carcinolytic activity of the folic acid antagonist by the simultaneous use of the citrovorum factor.

RESISTANCE

All chemical compounds so far proved to be carcinolytic in either the experimental animal or in man eventually produce resistance on the part of the surviving cancer cells. This phenomenon appears to be similar to the acquired resistance of bacteria to antimicrobial agents. One widely accepted explanation assumes mutation of the surviving cancer cells. Theoretical possibilities exist in the explanations concerned with possible alteration in the permeability of the cell to the carcinolytic agent, alterations in the utilization of the chemical which may become a food for the cell instead of a poison, and finally the utilization of alternate metabolic pathways by the cancer cell which thus may synthesize successfully the needed nucleoprotein by the use of routes not blocked by the carcinolytic agent. The solution of the problems of resistance would transform carcinolytic agents now of temporary value into therapeutic weapons capable of producing, in the case of certain tumors, actual cures.

THE CHEMOTHERAPY OF CANCER IN MAN

Chemotherapy has advanced to the stage of employment of several chemical compounds in the practice of medicine today. These include folic acid antagonists, such as aminopterin and methotrexate, the purine antagonist 6-mercaptopurine, or purinethol, nitrogen mustard, triethylenemelamine, and several related compounds including triethylenethiophosphoramid, myleran and urethan. All anti-cancer effects produced by chemical agents are still of temporary value with effects lasting from weeks and months, to, in a small number of patients, periods as long as seven years in our experience. Most of the beneficial results produced have been limited to acute and chronic leukemia, Hodgkin's disease, and the lymphoma group of cancers. In smaller numbers important beneficial effects have been observed in patients with tumors such as neuroblastoma, mammary adenocarcinoma, and small numbers of patients with carcinoma of the prostate and the lung, and occasional tumors of the brain, such as the glioblastoma multiforme. Such clinical investigations are still all too few in number. Our own experience is based upon the use of chemotherapy as part of the total care given to more than 1500 patients with disseminated cancer during the past eight years. We have under treatment at the present time 234 patients with disseminated cancer. It is too early in the clinical experience in this field to do more than point out evidences of temporary effect, to outline the problems which require study and solution, and to point the directions for more concentrated work. A few examples of the effect of carcinolytic agents in man may be given.

Acute leukemia may be affected by folic acid antagonists, ACTH, cortisone, and purine analogues, either singly, or in combination, or in sequence. From 50–70% of children with acute leukemia treated with folic acid antagonists alone respond with important degrees of improvement, lasting usually for many months and less commonly for two, three and four years. In one instance a boy is still alive and

in excellent health five years and seven months after onset of therapy. The use of ACTH and cortisone have prolonged these remissions or periods of survival. Since the introduction of the purinethol, 6-mercaptopurine, further remissions have been produced with a brief prolongation of survival. All beneficial effects are terminated eventually by the acquisition of resistance on the part of the surviving leukemia cells. No chemical employed on women with mammary tumors so far has been productive of the marked improvement produced by the use of appropriate sex hormones. A number of chemical agents have added comfort, if not increased survival, to those suffering from the various forms of lymphoma and chronic leukemia.

It has been possible to render surgically inoperable tumors operable after the use of irradiation and chemotherapy. The list is growing of tumors, such as rhabdomyosarcoma, usually radio-nonsensitive, which have been rendered radiosensitive by the use of chemical agents. No attempt will be made in this discussion to list clinical indications for the use of chemical agents, or to give details of the small number of truly impressive achievements of the action of chemical agents on certain forms of cancer. The rhabdomyosarcoma when beyond cure by surgical removal has responded, for example, to the 4-amino-9,10 dimethyl folic acid (adenopterin) in five patients in our experience. The neuroblastoma has responded favorably to the action of the folic acid antagonists, to triethylenemelamine, triethylenephosphoramid, and its analogues, and to nitrogen mustard. Such results are not of regular occurrence nor can they be produced consistently. No definitive cure of any form of cancer can be attributed at the present time to the use of chemicals alone.

Progress in the clinical investigation of carcinolytic agents derived from laboratory research has been slow for many reasons. There is a lack of clinical facilities, research beds, and clinicians who have the opportunity to work in vertical programs with biologists, organic chemists, microbiologists, pharmacologists and experimental pathologists interested in chemotherapy of cancer. The cost of such work is beyond the reach of most clinics and laboratories in the country but this deterrent is being removed rapidly by the appropriation of funds from governmental and private sources for this purpose. Progress is slow too, in such clinical investigations, because it is imperative that no experimentation in the laboratory sense of the term be exercised on a patient. The guiding principle must be that no chemical compound will be employed in the treatment of a patient except for the good of the patient. It is impossible to have a sustained observation of the action of a single form of treatment on a patient who does not respond to an agent within a short period of time. It is necessary under such conditions to change from one agent to another, from one form of treatment to another, in an attempt to make a patient comfortable, to prolong his life, and to prevent unnecessary pain. Strict adherence to the principles of total care, with the use of chemical agents, hormones, antibiotics, or other potentially carcinolytic agents, as rapidly as possible after careful study in the laboratory, limits the speed of progress from the purely experimental point of view, but is essential if our ethical standards are to be maintained.

It is hoped that more rapid progress will come from the discovery of simple methods of evaluating the carcinolytic action of chemical compounds in man. Such evaluation must be based always on sound knowledge of the life history and biological behavior of the various forms of cancer in man. One of the most important by-products of these initial clinical advances in the treatment of some forms of disseminated cancer in man is concerned with the added hope, based upon past accomplishments and the promise of present laboratory research, which may be communicated to the patient who knows that he is suffering from a disease incurable by methods of treatment of proved value. The knowledge that he will not be

abandoned, even though there is acknowledgment of the probable incurability of his disease, alone represents a great contribution to the care of the patient by modern chemotherapy research.

These then are some of the approaches to the chemotherapy of cancer. The dream of doctors and scientists for centuries has been realized within the last ten years. The breakthrough in the problem of chemotherapy of cancer has occurred. Certain rational approaches to the choice and synthesis of chemical agents may be used as intellectual exercises and foundations for further research programs on the basis of retrospective study of the mechanism of action of those agents of temporary carcinolytic action in man. It is impossible at the present time to construct the formula for the ideal carcinolytic agent to be synthesized by the chemist. The discovery of simple, accurate, rapid methods of screening carcinolytic agents will accelerate enormously the study of the thousands of chemicals already synthesized as well as the tremendous numbers of antibiotics, plant extracts, and bacterial products which must be studied for evidences of carcinolytic activity. Progress in our understanding of the mechanism of action of carcinolytic compounds so discovered will do much to provide a more rational basis for further chemotherapeutic research. Methods of preventing or overcoming the toxic effects of carcinolytic agents without altering the anti-tumor properties will make much more effective those agents presently available. The solution of the problem of resistance of surviving tumor cells to carcinolytic agents should permit actual cure of some forms of cancer by means of agents available today.

The application of the results of all such research in these several different approaches to the problem of chemotherapy of cancer in man must be accelerated by the provisions of means of communicating the results of such research, without delay, to all research workers, investigators, and institutions in the world concerned with this problem. Such methods are now being developed by the Committee on Chemotherapy of the National Advisory Cancer Council, sponsored by the National Cancer Institute, the American Cancer Society, and the Damon Runyon Memorial Foundation. On the basis of the acceleration of progress in the chemotherapy of cancer by *voluntary cooperation* through the machinery provided to implement the policy of this Committee on Chemotherapy of Cancer and with a view backward over the laboratory and clinical achievements in the chemotherapy of cancer during the past ten years, I have no hesitancy in expressing the opinion that cures for the many different kinds of cancer affecting man will be achieved by the use of chemical agents alone.

Biography versus History: With Special Reference to the History of Medicine[1]

By LLOYD G. STEVENSON,[2] M.D., PH.D.

TO A generation which has begun to think of James Boswell as the prince of diarists, after Pepys, and as the rival or peer of Casanova and Rousseau in public confession, it may not come amiss to observe that he won his first and most lasting crown as a biographer. Boswell thought that anyone who really disliked his great *Life of Samuel Johnson* must be a man of unenviable temper, cold-blooded and morose. In this he seems to me to have been right. As Boswell also said of himself, he Johnsonized the world; and whereas some are content with a single reading of the mighty *Life*, or even a sampling of its pages, others return to it again and again, as to a perpetual fountain of refreshment. But if the Great Cham of literature does not have for you the fascination which he exerted on so many of his contemporaries in the flesh, with so many of his admirers in after ages, there remain a thousand other subjects of biography, great men and little, who await your pleasure on the library shelf. Among the rest are any number of doctors. He who can find no life story here to suit his taste must be cold-blooded and morose indeed.

Johnson preceded Boswell in the practice of the biographical art. It was the department of literature he loved the best—"of the various kinds of narrative writing that which is most eagerly read and more easily applied to the purposes of life"—more easily, that is, than what he called the "useless truth" of history. Insofar as he enjoyed literary labor at all, he enjoyed writing lives. James Thacher, author of *American Medical Biography*, thought it "a delightful employment to portray the varied shades of the human character as exhibited on the great theatre of the world." Neither Johnson nor Thacher, however, viewed biography as entertainment solely, whether for writer or for reader. For Johnson, the interest of biography lay in "the parallel circumstances and kindred images to which we readily conform our minds," and he esteemed it "as giving us what comes near to ourselves, what we can turn to use." Thacher said of his own compilation: "Models may here be selected worthy of imitation by the physician, the Christian, the patriot and the philanthropist." Stephen W. Williams, whose *American Medical Biography* appeared in 1845, some seventeen years after Thacher's, considered that he, too, had traced patterns of conduct for aspirants to medical honors. Somewhat more specifically, at any rate much more eloquently, Sir William Osler put the matter thus:

> This higher education so much needed today is not given in the school, is not to be bought in the market place, but it has to be wrought out in each one of us for himself; it is the silent influence of character on character and in no way more potently than in the contemplation of the lives of the great and good of the past, in no way more than in "the touch divine of noble natures gone."

The pleasures and benefits to be found in this process of identification and comparison—Lord Oxford observed that "it brings comfort, it enlarges sympathy, it expels selfishness, it quickens aspiration"—are not the only advantages claimed for the reading of biographies. Not so much comfort and inspiration as knowledge, not so much appreciation of human psychology as understanding of human history, have been prizes very commonly looked for and commonly, but by no means invariably,

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found. Pettigrew—he of the *Medical Portrait Gallery*—asserted that his biographical method "obviates the fatigue which would accompany a more detailed or consecutive narrative, or chronological order of the History of the Science". That it was capable of achieving much the same ends he seems to have taken for granted.

A very recent book by John Carswell, *The Old Cause*, bears the subtitle, "Three Biographical Studies in Whiggism," and consists of essays on the lives of Thomas Wharton of the Junto, Bubb Dodington and Charles James Fox. I do not know that it is intended to be a history of Whiggism, but its reviewer in *The Times Literary Supplement* has chosen to consider it as an attempt to trace the main line of the party's development. Here is the way he deals with this idea.

> "Read no history," says the motto prefixed to the classic life of Disraeli, "nothing but biography, for that is life without theory." It was always a shallow motto, for history is made of more than individual lives, while for party history it is particularly sterile, as Disraeli's own versions of Tory history . . . may show. And this, not just because the development of a long-lived political party touches national history in all its facets, but for another good reason, that the "lonely walks of uninterested theorists," as Coleridge put it, have made and unmade parties without number.

A little further on the critic resumes:

> It was not from Dodington that Fox declared that he had learned all he had of wisdom, but from Burke, who in his turn affirmed his school was "the usage of Parliament" and appealed from the new Whigs to the old. And they again, Russells and Whartons, Hampdens and Sidneys and Montagus, looked back to those who had bled for the old cause. Such a cause, however clothed or personified, for its three centuries of life demands more analysis than any biography; it must breathe something better than Tom Wharton's horses and wenches, or Dodington's Burgundy; it must, as Harrington said of the constitution, have "earth for its roots and heaven for its branches."

I quote this review not as an unusual reaction to the biographical method in history but as one that is nowadays very nearly standard. Copernicus, Darwin, and finally Freud have made man less sure of his universe, less sure of his unique status in the world, and less sure of himself; the steady growth of determinism has made us more and more uncertain of the role of the individual in the social universe of man. It is interesting that the method should be denounced as "particularly sterile" in political history, for it is just in this area that it has enjoyed its longest, though not its last, extensive vogue. Kings and statesmen have been represented as the shapers and determiners of history since history first was written. Subject as they were in varying degree to the will of God, or to some other overmastering power—for example, since the time of Hegel, to a tendency, often rather vaguely defined, called the spirit of the age; constrained as they were by the eternal, the extra-personal ends of the great historical process, sometimes conceived as repetitive and cyclical, sometimes as progressive and even definitive; limited in their control of events by these and lesser, simpler considerations, the great political and military heroes have nevertheless appeared to generation upon generation as the principal doers and shakers, and have had the pages of history pretty much to themselves.

It is not only, however, that the hero's part in political, military and ecclesiastical history has been "cut" rather drastically; these divisions of history, in which the hero has flourished for so long, have themselves declined in relative importance with the appearance of rival studies. That this change has gone far and deep is shown by contemporary uneasiness about its significance. It is, in fact, already an old story. On 17 November 1954, David Knowles delivered his Inaugural Lecture as Regius Professor of Modern History in the University of Cambridge, choosing as his subject, "The Historian and Character." One of the opening paragraphs of the printed lecture reads in part as follows:

> It is a commonplace among historians today, to lament, perhaps not very sincerely, that history, which till comparatively recently was primarily the history of the State or the Church, has now proliferated in every direction into constitutional, social, economic, administrative, cultural, imperial and what not, so that the being who is sometimes quaintly known as the 'straight' historian, or even as the 'pure' historian, is a great

rarity. One of the many consequences of this is that academic historians are notably less concerned with men and women, their personalities and their characters, than they were a century ago. If Charles Kingsley's saying, that 'History is the history of men and women, and of nothing else,' seemed paradoxical in his own day, it would seem scandalous now. Even when the historian treats of individuals, he does so with a greater diffidence than before. The individual appears so small in the universe of events; he is so strictly bound by heredity, by ignorance, and by circumstances; the alternatives before him are so limited, the space for manoeuvre so small; the predicament . . . is so urgent. And, finally, our generation is less convinced of its standards and laws than were those of Macaulay and Stubbs.

The substance of Professor Knowles's lecture is an examination of the means available to the historian for forming his opinion of character, and the nature of his duty, to judge or not to judge, the actors in his narrative. The day is past, he concludes, when a Motley could pronounce Philip II of Spain a paragon of evil or when a Mommsen could proclaim Julius Caesar "the perfect and entire man." But the same considerations which have been mentioned as confining the grounds of moral judgment have also narrowed the basis of purely historical assessment. Human limitations on the one hand, and the immense complications of circumstance on the other, seem to have effected a shrinkage of individual responsibility in both aspects. The universe seems incommensurable with us, and all of us, *en masse*, with any one of us. That one man can "cause" a war or "cure" a depression seems to be more than ever doubtful.

Louis Gottschalk tells us, indeed, that "social psychologists are perhaps in part responsible . . . for a recently renewed emphasis upon the significance of leadership and personality in social movements—a significance which even Marxist historians now concede." This sounds, at first, like a reversal of the current just described. Actually it turns out to be no more than an eddy; for the example which follows comes to this: that one of the most "sociological" of historians "admits that human efforts sometimes help to shape events, although along with so many other factors as to have no appreciable effect in changing their inevitable outcome." This is very far from a return to heroes and hero-worship!

It is hardly necessary—which is fortunate, because it is also hardly possible—to indicate all the various elements of "causality" which historians have introduced to take the place of the hero and the villain. Karl Marx, perhaps the most influential of modern historians, substituted broad classes for individual actors in the drama of human events; at times he de-personalized history still more by representing these human groups in the fearful clutch of impersonal economic forces. The economic viewers of history have often shown, however, a strong inclination to pronounce moral judgments and to distribute praise and blame. A very recent book about the late President Roosevelt, which holds him personally responsible for half the misfortunes of the world of today, reproaches him, with curious logic, for adopting "the devil theory of history" and blaming the social ills of the United States on those he designated "economic royalists."

In addition to the economic factors, social, religious, political and cultural determinants of history have been singled out with great assiduity, and even with considerable passion, by historians of varied temper and training who have thus thrown light on the past from many directions. If the hero and the villain have not vanished from history—the ghost of President Roosevelt, for example, is busily occupied in both these capacities—it has at any rate become obvious in political writing that they are chiefly useful when the aim is the aim of propaganda. This applies even to the history of remote periods, for so great an historian as Mommsen seems to have had an eye to contemporary events when he sang the praises of Caesar. Social, and particularly religious, history share this improving tendency, and in John Farrow's *Damien the Leper* may be seen a very popular example which also happens to merge into the history of medicine.

It might be supposed that the history of science and the history of medicine, two of those newer subdivisions of history which, in

the opinion of Professor Knowles, have caused by their proliferation a lessening of concern with the individual, would exhibit an impersonal and theoretic character, would rely very heavily on economic, social, political, religious and cultural explanations. To some extent—perhaps to an increasing extent—they do so. It is now more than twenty-five years since Henry Sigerist was appointed to the chair of the history of medicine at Leipzig, more than twenty years since he brought his magnificent talents to America to the William H. Welch chair at the Johns Hopkins. To Sigerist, more than to anyone else, we owe today's increasing interest in the social and cultural aspects of the history of medicine. It would be wrong to say that he is the hero who has banished heroes from medicine: this has not been his purpose, and certainly his work has not had this effect. But that historians of medicine now take account of broad social factors, that they now draw inferences from the general culture of whatever period they engage to study—this is owing in no small measure to Professor Sigerist's example and to his personal activity and inspiration. No doubt the historiography of medicine must also acknowledge the effects of the climate of opinion during this period of change, and no single medical historian can account for whatever change has occurred. Sigerist himself, to take the most eminent example, has been much indebted to certain historians of art.

Having mentioned the growth of interest in the economic, social and cultural history of medicine, I am forced to confess—what all of you surely know—that it is still far outmatched by continuing interest in medical biography, or in that form of history which Lancelot Hogben has described as "a chronological sequence of obituaries." For every historical paper of a general or synoptic nature there appear a dozen biographies, short and long, of physicians and surgeons, some of general, others of merely local importance.

Now we are assured by Professor Knowles that

> the tasks of biographer and historian are different. Biography, the poet tells us, 'is about chaps'; but if it be, it takes them one at a time, whereas the historian's regard sweeps wider and deeper over a field of folk. For the biographer, his subject is the centre of his world, and he is concerned with presentation rather than with assessment, illustrating every facet of character with a careless bounty that an historian cannot afford.

This paragraph refers particularly to such comprehensive and intimate biographies as those written by Roper, Boswell, Lockhart or Trevelyan, a category which would also include Cushing's *Life of Sir William Osler* and Fulton's *Harvey Cushing*; but Sir D'Arcy Power, possibly the ablest and most industrious of the writers of compendious biographical sketches, asserted that although "an account of the great medical writers and teachers forms an important branch of the history of medicine", yet the purpose of biography "is not that of history and it serves no biological or anthropological science." Careless bounty, then, is not the quality of the biographer which distinguishes him from the historian. It is rather this—that his subject, whether hero or villain, is for the duration of his task the centre of his world. As Sir Henry Irving is said to have edited, produced and acted not only *Hamlet* (which lent itself particularly well to his intent) but also every other play in which he appeared, in such a manner that a single role became all-in-all, so the biographer is tempted, indeed half coerced, into marshalling history round a single focus. He succumbs too often to what Sir Thomas Browne called "testimonial engagements." Or, to borrow a wonderful adverb from Max Beerbohm, he writes "certificatively." The virtues of sympathy and loyalty, without which he is ill-equipped to write biography at all, may easily become vices. At best, he finds it hard to be objective. Should he dislike his subject, this too will involve him in dangers and penalties. When national or sectarian or political sentiment darkens counsel, as so often it does, this is never more apparent than when it is joined to the personal loyalty of a champion. Italian authors who believe that Cesalpino should be accorded full honors as discoverer of the circulation of the blood sometimes damn William Harvey as a plagiarist, while true-born Englishmen, charging to his

rescue, are ready to smite Cesalpino together with his latter-day disciples.

Possibly the chief danger, however, is of another kind. The doughty friends and implacable detractors of Harvey are both alike in ignoring the cultural framework of his great discovery. To take it into account in real earnest, to study—as John G. Curtis, Walter Pagel and others have done—the Aristotelian, Galenic, Neoplatonic and other elements which make it up, may seem to the more devoted admirers of Harvey, or for that matter of Cesalpino, a belittlement of genius. This it is not, and it is only by the application of such methods that history performs its essential service, and at the same time overwhelms factional bickering and raises discussion above the national and personal level.

Even in the absence of strong feeling, the tale which has as its nucleus a single man is altogether too likely to be neglectful of such a framework. A mote in my own eye relieves me of the necessity of searching for beams elsewhere. Nearly ten years ago I published a biography of Sir Frederick Banting which will serve to illustrate my point. With the literary merits and defects of this book I have not at the moment to deal; neither shall I direct attention to incidents of Banting's life as I have described them. What distresses me most on looking into its pages once more is the perfunctory indication of the background of knowledge and thought against which this important discovery should be viewed. How did it happen that the internal secretion of the pancreas was isolated again and again in the generation before its ultimate "discovery" and yet remained, in point of fact, undiscovered? Since the final triumph was the outcome of a close race, with several contestants in other centers advancing rapidly, but not quite rapidly enough, toward the same goal, how was it that the moment had so evidently arrived for the attainment of insulin by twentieth-century science? Now, to ask these questions is not to detract in any way from the credit due to Banting and his colleagues. Queries of this sort have been raised repeatedly with respect to fifty examples of coincidental, independent discoveries and "photo finishes." They should always be raised, and if possible answered, in connection with any scientific discovery whatever when a number of independent investigators, often widely scattered, direct their efforts to a common end and converge on a common goal, even although a single one of them is clearly the first to reach it.

History must always endeavour to provide answers to the questions "How?" and "Why?" and "When?". Paradoxical as it may seem, the history of science, replete though it is with famous names, is not primarily concerned with the much more popular question, "Who?". This, I think, is the everlasting failure of the historian whose preoccupation is to compile a list of so-called "firsts." It is a failure to which students of the history of medicine are especially liable. For the profounder purposes it is of course necessary to find out who were the pioneers—who "first" crossed an ocean, discovered a river, conceived a policy, devised a technique, isolated a secretion, implicated a microbe or performed an operation. You will observe that such achievements differ very markedly in their nature: some of these attributions will be easier than others. But even if it were possible in every case to apportion honors with even-handed justice—and of course this is often exceedingly difficult—the list would fall very far short of any possible definition of history. Where a fundamental or multivalent concept is to be considered, this method breaks down completely. Evolution is only in a narrow sense the theory of the transformation of species, but even in this narrow sense it is quite without avail to ask who its "founder" or "father" may have been. In the later development of the theory Charles Darwin was certainly foremost, but equally certainly he was not "first". Even the special turn he gave to his explanation was not quite exclusively his own.

An idea of much narrower scope than this may be the resultant of forces seemingly remote in their nature and actually far removed in time and space. This, then, alleviates in some measure my self-reproach when I consider Banting. The intellectual setting in which his

work was done I should have sketched with greater care and wider reference. And yet, had I confined myself solely to the literature of diabetes on the one hand and the pancreas on the other, had I ignored the obvious relevance of the general idea of internal secretion and the earlier specific work, notably the epochal studies of thyroid function, had I marked out such limits as these and carried my story back to the seventeenth-century pancreatectomies of Johann Conrad Brunner—what would have happened to Banting? It would have been possible, of course, to strike a better balance, to compromise more satisfactorily between history and biography; but in just so far as the former approached adequacy, the latter would have suffered depletion. The central figure, no longer displayed in the Irving tradition at the heart of every scene, would have been jostled hither and thither, quite overwhelmed by the crowd, to emerge at last in the grand finale of a story that was not his.

Permit me for a moment to adopt, without examination or comment, a conception of history worked out by a celebrated philosopher, the late Professor Collingwood. "Of everything other than thought," wrote Collingwood, "there can be no history." This statement is perhaps easier for us to understand with reference to the history of science than we would find it were political history our theme; in any case I ask you to receive it provisionally without regard to Collingwood's metaphysical argument. It follows, in his opinion, that biography,

> however much history it contains, is constructed on principles that are not only non-historical but anti-historical. Its limits are biological events, the birth and death of a human organism: its framework is thus a framework not of thought but of natural process. Through this framework—the bodily life of the man, with his childhood, maturity and senescence, his diseases and all the accidents of animal existence—the tides of thought, his own and others', flow crosswise, regardless of its structure, like sea-water through a stranded wreck. Many human emotions are bound up with the spectacle of such bodily life in its vicissitudes, and biography, as a form of literature, feeds these emotions and may give them wholesome food; but this is not history.

It may seem to you that the figure of speech is unfortunate. You may find it hard to agree that the tides of thought are so vast and sweeping, so cold, so remote from the influence of individual human life and its biological structure. My object in reading the paragraph is not to persuade you of its truth, but only to draw your attention to a possible view of the matter very distant indeed from Disraeli's dictum that there is no history, only biography. It is a view, as I have said, to be comprehended best in terms of intellectual history.

If you are a playgoer—and even more certainly if you have trod the boards yourself—you will know what is meant by "masking." Now this is one of the dangers of biography, as well as of autobiography, that the principal character will constantly "mask" all others. This time I shall find my example in one of the finest biographies of recent years, Cecil Woodham-Smith's *Florence Nightingale.*

The Crimean Sanitary Commission, said Miss Nightingale, "saved the British Army." Mrs. Woodham-Smith informs us that "it consisted of Dr. John Sutherland, an official of well-known ability and advanced views from the Board of Health, Mr., later Sir, Robert Rawlinson, a civil engineer of eminence, and Dr. Gavin." This statement is slightly misleading only because incomplete: not Sutherland alone but all three of the Commissioners had been members of the Board of Health; the Commission was, in fact, Edwin Chadwick's old Board reconstituted; the Commissioners had been selected, proposed and instructed by Chadwick. In Sutherland, who was to become her trusted adjutant in the great campaigns of her later life, Miss Nightingale acquired for her service one of Chadwick's most faithful disciples and lieutenants. To Sutherland she wrote in 1857, "As for sanitary matters . . . I know nothing about them except what I have learnt from you."

But wherever she had imbibed the principles of sanitation—and actually she had taken the general credo with her to the Crimea—they were Chadwick's principles. Not that he had invented them; their lineage on the medical

side stretched back to antiquity, to the authors of *Leviticus* and of the Hippocratic work called *Airs, Waters and Places*, and on the economic side they embodied the doctrines of Bentham; but these principles had been enunciated, had been related to pressing current problems, had been buttressed with facts and figures, and had been applied in practical legislation by Chadwick. Nothing of consequence in Miss Nightingale's views—the question of nursing apart, though even her nurses were to be in some measure the agents of sanitation—but can be found a generation earlier in the writings of Chadwick. This statement implies no derogation whatever of Miss Nightingale's practical, administrative and political genius, which seems to me one of the world's wonders.

What part, then, is Chadwick to play in Miss Nightingale's biography? In his initial appearance he is mentioned as one "who had sat on the first Poor Law Commission of 1834 and instigated the first Sanitary Commission of 1839." Along with Lord Stanley, Sidney Herbert and others he is one of those who "wrote for her" in the quarterlies and reviews in a press campaign for army reform, she supplying him with a sketch for his guidance. Ninety pages later she is explaining to him the causes of vice in the Army. Another sixty-eight pages and we find certain "journalists, including Edwin Chadwick," applying to Miss Nightingale for facts. On the next page she approaches Chadwick, who is serving on a House of Commons Committee, with an offer of information. Three pages later she secures Sir Harry Verney, Edwin Chadwick, Charles Villiers and John Stuart Mill to speak against a bill in the House. And that is all.

If previously unacquainted with Chadwick, one might read this book from cover to cover and never learn that Miss Nightingale's exceedingly important work was very largely the bringing to bear of Chadwick's ideas on a particular problem, the outdated sanitation of the British Army. Even Miss Nightingale's three cardinal principles of workhouse reform, the ABC of a matter in another Chadwick province, are set forth in some detail without any intimation that all of them may be found, in only slightly different form, in Chadwick's Poor Law Report of 1834, written when Miss Nightingale was fourteen years of age.

Is not Chadwick effectively "masked"? This is not so much a question of a long tradition of thought, of a great tide of opinion left out of account; it is the question of a specific contemporary influence quite ignored. This is the biographer's peculiar temptation. S. E. Finer, who barely mentions Miss Nightingale in his admirable book about Chadwick, cannot be charged with "masking"; but she was too important to Chadwick's crusade to be left altogether out of account.

What are we to say, then? Are we to say with Carlyle that history is the essence of a *hundred* biographies? Perhaps there is nothing more to the problem than this. Biography is like a Henry Irving production on a proscenium stage: the script is "tailored" to glorify a single part and the mechanics of the theatre make infinite "masking" inevitable. History, on the other hand, is a script that is written for no one actor more than another; it is produced, what is more, on the arena plan, so that every actor has a fair chance, and if each is "masked" at certain moments from certain viewpoints, he is at other times the focus of attention and is happily blocking his rivals from sight.

Now, are these definitions satisfactory? Is this distinction valid? I am afraid that the answer is no in both instances. For history is not really a drama in any theatrical sense whatever. It is a huge and complicated narrative, sometimes grubby enough, of workaday men and women, as well as a sparkling tale of the brilliant, articulate and accomplished, the doers and shakers. It attempts to answer two primary questions—(1) what was the life of men and women (generally) in past ages? and (2) how did the present state of things evolve out of the past? To answer either question it is not enough to have the biographies of the great. Lesser men, perhaps eminent in their day, may have much to tell us—as Dr. John Keevil has demonstrated in his books about the Hameys—*Hamey the Stranger* and *The*

Stranger's Son. But below and beyond these are others, and others yet again, usually nameless, who may add bit by bit to the sources of history in the evidence of mass opinion and popular action, but whose biographies will never be written. Occasional memoirs of a man from the ranks are exceptional; they are not of a nature to affect the argument. Though we may disagree in theory, we continue for the most part to act and to write according to the dictum of Sir Sidney Lee: "the life of a nonentity or a mediocrity, however skilfully contrived, conflicts with primary biographic principles." And yet who today would commit himself to the view that nobody matters in the history of the world but the exceptional man or woman? Besides, "who knows [the question is Sir Thomas Browne's] whether the best of men be known? or whether there be not more remarkable persons forgot than any that stand remembered in the known account of time?"

There are, it is true, collections of shorter biographies which are unselected as regards the personal importance of those admitted to record; such, for example, as the books which try to give an account of every individual who has graduated from a given college or university. Here we may mention Munk's *Roll of the Royal College of Physicians of London*, Plarr's *Lives of the Fellows of the Royal College of Surgeons of England* and R. W. Innes Smith's *English-Speaking Students of Medicine at the University of Leyden.* If it is true, as Knowles put it, that "the historian's regard sweeps wider and deeper over a field of folk," are not these important contributions to history? Rather, of course, they are source materials, and occasionally, though not as often as might be wished, they have been comprehensively used. Many years ago Dr. William H. Welch gave an example of the use of biographical sources for general and statistical information, in this case the biographies of Yale graduates for the sake of general conclusions on the "Relation of Yale to Medicine." Major Greenwood attempted in the same way to elicit from Munk's *Roll* and the *Dictionary of National Biography* information about eighteenth-century medical education and medical practice. The history of medicine affords fewer examples of this kind than political history, for biographies of the members of certain parliaments or congresses—even, quite recently, the biographies of the clerks of the House of Commons—have been specially compiled for such broader purposes. History is served, but here, one must admit, the best aims of biography are often slighted. Color is drained away.

It is always possible, of course, to have too much color. I have mentioned the way in which the hero of a biography may "mask" other contributors to thought and other contributions. All too often, in the anecdotal biography, the poor fellow "masks" himself, so to speak, and conceals his own achievements. Emily Dickinson has been subjected to a great deal of romantic, anecdotal biography, but as Randall Jarrell has recently remarked, "after a few decades or centuries almost everybody will be able to see through Dickinson to her poems." Two centuries seem not to have sufficed for us to see through John Hunter to his work. Everybody knows a dozen anecdotes about Hunter, but what, after all, did he do—apart from devising a single operation, confounding together gonorrhoea and syphilis, and ruining himself financially in the collection of strange animals and Irish giants? Did he establish scientific surgery? What does it mean to say that he made surgery a science, if he did so? All we get for answer is another selection of anecdotes. We, like sheep, look up to his biographers and are not fed. (Some Hunterian orators, certainly, give us partial answers, but since Hunter is the patron saint of the Royal College of Surgeons, many of these addresses are "certificatively" written; even the best of them have insufficient scope. His works, and the usually unconsidered catalogues of his museum, are the best sources.)

It is not, you will say, by any means necessary that biography should leave history out of consideration, or that history should crowd out biographical interest, and with this I agree. "It ought not to be impossible," says Gottschalk, "to find the golden mean that exists

somewhere between the *histoire sans noms* of some anthropologists and the *noms sans histoire* of some biographers." In the history of medicine the most striking instance has been provided by Dr. Sigerist, whose *Great Doctors* is still the best introduction to the subject. Yet how many pages of this delightful book are not strictly biographical at all. Each of the great doctors represents, for Sigerist, an idea, a pattern, a trend, the dominant theme of a period; so that a chapter which ostensibly deals with a medical hero may turn out to be a chapter in intellectual or social history, wearing a personal name for title as a chapter in political history may wear the name of a monarch. Portraiture is by no means disregarded, but the canvas is a broad one and the total effect is that of a landscape with figures.

By and large, it is likely to be true that the more and better the history, the worse the biography. This has been stressed by Harold Nicolson in his book on *The Development of English Biography*. What he calls the life-and-times method he considers to be something apart from the main tradition of literary biography. For this reason he devotes very little attention to such impressive biographical monuments as Carlyle's *Frederick the Great*. Professor Neale's *Queen Elizabeth* he rightly considers to be a study in Tudor history. In fact all reconstructional biographies, as distinguished from the contemporary memorials created by a Boswell or a Lockhart, are more likely to bury a life in the mountainous debris of a time.

It is not only, however, the more or less extraneous matter which may obscure the outlines of a career. It may happen to be your conviction that the spiritual or mental life is of much greater significance in the career of an individual than outward circumstances: his opinions, his ideas and his works may seem to you the most important aspects of his life. Dr. Erwin Ackerknecht's recent book about Virchow deals with him, as its title indicates, under three categories—doctor, statesman, anthropologist. "In an analysis of the work," he tells us, "it is impossible to synchronize Virchow's simultaneous activities without falling into utter confusion." A short life history is introduced for chronological orientation, but the book as a whole may be called a "biography" only in the special sense I have indicated. As history, it is none the worse for this. Its author disclaims any intention to write a history of pathology or German liberalism or anthropology, but he nevertheless presents more of each than would be possible, or at least desirable, in a conventional biography.

Quite apart from the history of ideas, though not to be separated from intellectual history in practice, is the story of disease itself. Until very recently, disease has been affected rather little by what onlookers thought about it. It has crawled or swept on its way, oblivious of charms and spells, of diets and exercises, of heroic bonfires for prophylaxis and heroic drugs for treatment. All this, like so much else that is relevant to the history of medicine, is very largely outside the province of biography. In compiling materials for his study of *Malaria in the Upper Mississippi Valley*, Dr. Ackerknecht, Virchow's biographer extraordinary, found that for a variety of reasons it was impossible to give his work the quantitative character he desired for it; one of the reasons he advanced was that "previous local medico-historical studies are almost nonexistent, since most historians have the fatal tendency to write rather the history of doctors than the history of medicine and disease."

Malaria in the Upper Mississippi Valley deals largely with the factors which may have brought about the decline of the disease, most of them economic and social. Dr. George Rosen's *History of Miners' Diseases* treats of the factors which produced, sustained or depressed these diseases, of their social and political relations, and of medical ideas about them. Dr. Owsei Temkin's *The Falling Sickness, A History of Epilepsy*, is essentially a history of ideas concerning this malady from the Greeks to modern times, imbedded in the matrix of general culture. Now a history of disease, like any other kind of history, may turn out to be a special brief, justifying or glorifying a particular doctrine or even a par-

ticular man. But the temptation in this direction is not as strong as it is for the biographer. Read any one of the three books just mentioned and you will find its author uncommitted, disinterested, objective. You will also find that every page is rich with medical facts and historical insights. While I invite your attention to such works as these, there are other branches of the history of medicine which bear golden apples too.

The great province of biography remains to be indicated once more at the last. It seems to me that its interest is partly scientific, that is to say, psychological, and partly literary. Its didactic and inspirational elements, so strongly emphasized by Johnson, have not, however, lost anything of their attraction. "The Lathams, the Watsons, the Pagets, the [William] Jenners, and the Gairdners have influenced the profession," said Osler, "less by their special work than by exemplifying those graces of life and refinements of heart which make up character." Osler himself is sealed of the same brotherhood. We shall never lose our need of the inspiring, and sometimes dismaying, examples of "noble natures gone."

Addendum: Since this essay was written, Professor Owsei Temkin, in a paper entitled, "On the Interrelationship of the History and Philosophy of Medicine," read at the twenty-eighth annual meeting of the American Association of the History of Medicine, Detroit, 13 May, 1955, has drawn attention to the significance of a passage in *The Evolution of Modern Medicine* in which Osler set forth his rationale for the biographical method. This passage begins with the following sentence: "History is the biography of the mind of man, and its educational value is in direct proportion to the completeness of our study of the individuals through whom this mind has been manifested." This clearly implies some recognition of the continuum which underlies and connects individual lives. In my opinion *The Evolution of Modern Medicine* falls far short of this program, but the intermittent effort to conform to it provides the book's greatest interest and value; the very title he gave to it reveals Osler's intention.

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Correction

In vol. 23, no. 1, p. 24, rt. col. line 10 should read, "tions, clastic models by Auzoux, the Politzer".

A Brief History of the John Rhea Barton Chair of Surgery*

By WILLIAM A. DAMON, M.D.

I—INTRODUCTION

NO COMPLETE history of the University of Pennsylvania School of Medicine exists. Cheyney's excellent *History of the University of Pennsylvania, 1740–1940* probably represents the closest approach to this goal, and yet Cheyney himself admitted the inadequacy of his treatment of the School of Medicine after 1880. In a small way this paper may contribute to the writing of such a history by giving a brief history of the John Rhea Barton Chair of Surgery.

A study of the John Rhea Barton Chair of Surgery is important not only in relation to the history of the School of Medicine, but also because of its intrinsic historic import as the oldest fully endowed medical professorship in the United States. To my knowledge this important Chair has not previously been the subject of historical analysis.

There is a dual, but complementary, orientation in this paper: historical and surgical. With the historical orientation I hope to sketch in bold outline the history of the John Rhea Barton Chair of Surgery, stressing not only its historical significance, but also the continuity in the succession of incumbents to this Chair. The discussion of each Professor will center about his major appointments preceding that as John Rhea Barton Professor of Surgery, and the circumstances surrounding his giving up this appointment (*e.g.*, death, retirement, illness).

With the surgical orientation I shall summarize briefly the major contributions to medicine made by these Professors, whether as surgeons *per se*, innovators of surgical techniques, teachers, writers, researchers, or administrators. No systematic attempt will be made to include the non-surgical (*e.g.*, civic, philanthropic) contributions of these men, important as they are. With the emphasis on the contributions of these men to surgery, biographical data will be minimized except insofar as they may be required for understanding the course of events. For the same reason, no attempt will be made to list the degrees, honors, memberships, or appointments outside the School of Medicine held by these men.

II—JOHN RHEA BARTON, M.D.

John Rhea Barton was born in April, 1794,† in Lancaster, Pennsylvania (1). After having spent 5 years at the Pennsylvania Hospital under the preceptorships of Drs. Philip Syng Physick and John Syng Dorsey, he received his degree from the University of Pennsylvania School of Medicine in 1818. He then practiced surgery in Philadelphia until his retirement in 1840; the reason for his retirement at the age of 46 is unknown. He died thirty years later of pneumonia, on January 1, 1871. His only affiliation with the School of Medicine was as a medical student, although his uncle, Benjamin Smith Barton, had held various professorships in the School of Medicine until his death in 1815. The uncle, an eminent botanist, has been called "the father of American materia medica" (2a).

Barton made many important contributions to surgery. He conceived and developed the concept and technique of arthroplasty, described a specific wrist injury (Barton's frac-

* One of the essays submitted in the first annual contest sponsored by the Section on Medical History of the College of Physicians of Philadelphia.

† Some secondary sources give his year of birth as 1796.

ture), devised a simple but effective head bandage (Barton's bandage), and devised an absorbent dressing for draining lesions (Barton's bran dressing). Peltier (3) concludes:

> Barton's fame rests today not on his bandage, bran box, or even on his fracture. It rests on his conception and execution of the first successful arthroplasty and his pioneer work on osteotomy for the correction of deformity. These operations are a part of the basic armamentarium of the surgeon engaged in reconstructive surgery. Among his students were several who were influenced by the stimulus of his example and who, by emulation, made great contributions to surgery. No finer monument to his name could exist than the John Rhea Barton Chair of Surgery, whose occupants have exercised great influence on the development of surgery. It is time to rescue Barton's career from the obscurity which has cloaked it and to recognize him for what he was, one of the founders of a great tradition in American surgery.

III—FOUNDING OF THE JOHN RHEA BARTON CHAIR OF SURGERY

The John Rhea Barton Chair of Surgery is unique in that it is "the first full permanent endowment of a medical professorship in this country" (4). Until the latter portion of the 19th century, medical teachers were reimbursed by directly collecting fees from their students. However, fees from students represented only a part of their yearly incomes, since they were almost invariably in active practice throughout the year. One of the evils of such direct collection of teaching fees was the commercialization of medical instruction, for under this system the teacher having the largest classes and fewest failing students made the most money. The rapidly growing interest in laboratory instruction in the 1870's made this bad situation worse.

> Before the necessity for laboratory work became generally apparent the student fees were sufficient, but as laboratories were built and equipped expenses mounted so rapidly that classes of ordinary size failed to produce enough revenue. As a result a school had either to admit larger classes than could be properly handled or omit the necessary equipment for proper teaching. . . . Endowment is the crying need of the modern medical school (4).

Correction of this situation of direct payment of student fees to teachers was not initiated in this country until 1871, at Harvard (4). At the University of Pennsylvania this change took place in 1877 (5).

As for the matter of endowment, at a meeting of the Trustees of the University of Pennsylvania (6a) on November 6, 1877,

> It was announced that the sum of Fifty Thousand Dollars had been received from Mrs. J. Rhea Barton, the income thereof to be annually forever appropriated to the payment of the salary of a Professor of Surgery who should be the occupant of a Chair to be designated as the John Rhea Barton Chair of Surgery.

The only entries in the minutes of the School of Medicine (7) and the University (6b) dealing with the founding of this Chair are limited to resolutions accepting the gift, and minutes recognizing D. Hayes Agnew's commemorative biographical sketch (8) of Dr. Barton at the commencement ceremonies in March, 1878. There are no entries dealing with the actual setting up of the endowed Chair, or with the designation of the John Rhea Barton Professor of Surgery as head of the Department of Surgery, or with the formal appointment of Agnew as the first incumbent, hence an exact chronology of these early events is impossible.* Even Adams' (9) excellent biography of Agnew is not specific about the exact date of Agnew's assumption of the title. The earliest record I can find assigning him the title John Rhea Barton Professor of Surgery occurs in an announcement of courses (10) published in January, 1878.

With the foregoing brief discussion of Dr. Barton and some observations on the financial aspects of medical education in the 1870's, we can proceed to a discussion of each John Rhea Barton Professor of Surgery. Figure 1 is included to give in schematic form the essential biographic features of the John Rhea Barton Professors of Surgery, both individually and as a group. Reference to this chart from time

* There probably was no need at that time to define the John Rhea Barton Professor of Surgery as head of the Department of Surgery because until 1936 this Department had only one full professor at a time, the John Rhea Barton Professor of Surgery.

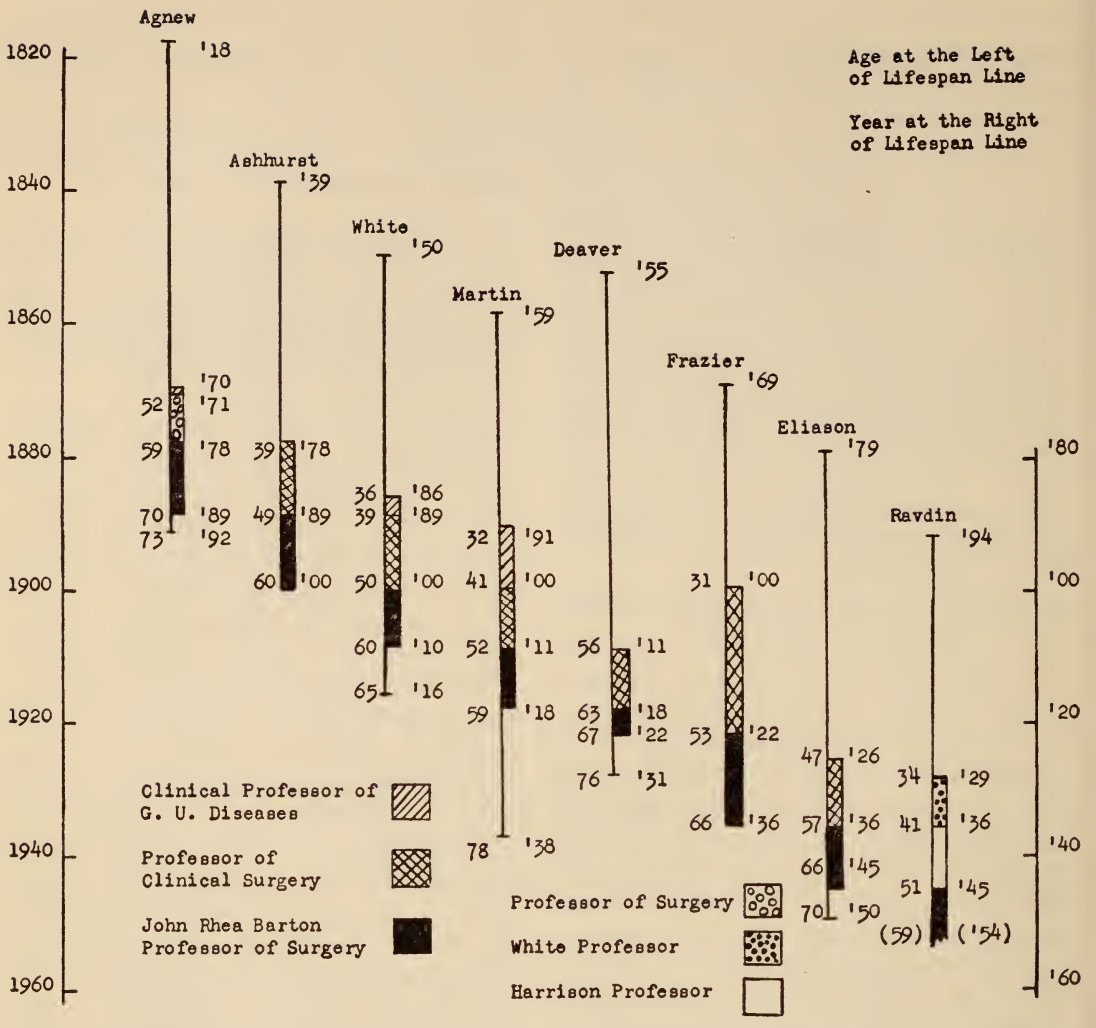

FIG. 1. A graphic representation of the lifespan and important appointments of the John Rhea Barton Professors of Surgery.

to time will help to show and clarify relationships not otherwise apparent in the text.

IV—THE JOHN RHEA BARTON PROFESSORS OF SURGERY

General considerations: The first six John Rhea Barton Professors of Surgery were born and bred in and around Philadelphia. All eight Professors received their medical educations and M.D. degrees at the University of Pennsylvania School of Medicine, and all received teaching appointments in the same school, usually in the departments of Anatomy or Surgery, shortly after graduation. Once appointed to the School of Medicine, every man (except John Deaver) continuously held at least one appointment there until he retired or died. All were trained as general surgeons, and though each man naturally had his own special surgical interests, all except Charles Frazier remained general surgeons. At no time was a surgeon brought in from outside the School of Medicine as John Rhea Barton Professor of Surgery, so that since the creation of this Chair, the surgical department has been headed by a succession of men long trained at,

and closely associated with, the School of Medicine. Two Professors further served the University as Trustees.

All the Professors who were in a position to serve their country in wartime acquitted themselves well, and more than one discharged his obligations with distinction. Each man was a member of many important surgical and academic organizations. Frequently they held important offices in these organizations. For example, all were members of the College of Physicians of Philadelphia, and both D. Hayes Agnew and John Ashhurst, Jr., served as President of this organization.

Two or three examples must suffice to illustrate the important fact, already alluded to, that although this paper concerns itself with the surgical contributions of these men, it would be a mistake to think that these activities constitute the only, or even the most important, contributions of each of these men to society. J. William White did much to found and further the Department of Physical Education in the University, and during the last two years of his life he was instrumental in organizing and raising money for the University of Pennsylvania Unit of the American Ambulance Hospital in Paris (11). Excerpts from his will, included in a memoir (12), give a sample of the variety of his many strong civic and philanthropic interests.

Edward Martin's civic activities were fully as important as his surgical activities, for he was an active member of the Philadelphia Board of Public Education for 26 years, Commissioner of Health of Pennsylvania for the 4 years following the first World War, and was generally active in state and local public health programs, especially with regard to diphtheria immunization and venereal diseases (13).

As a final illustration, note that Charles Frazier "organized the Public Charities Association of Pennsylvania, and gradually developed it into a state-wide group to the great betterment of the care by the state of its handicapped, feeble-minded, insane, and penal classes" (14).

DAVID HAYES AGNEW (1818–1892)

In 1871, Agnew had been appointed Professor of Surgery, and so at the time of the Barton gift he was the obvious candidate for the new Chair. During his first year as John Rhea Barton Professor of Surgery he published the first of three volumes on *The Principles and Practice of Surgery*, the second and third volumes appearing in 1881 and 1883, respectively. This was his most important work (15).

> The tremendous resources of his vitality may be better estimated when it is realized that his work was done at the very time of life when he was busiest in practice, busiest at the University, and busiest in consultation work. The work on the second and third volumes came about the time of the Garfield case, which added to his already tremendous routine of work.... It has truthfully been said that never again can such a work on the subject of surgery, with all its broad ramifications, be produced from one man's experience (9).

That Agnew's broad experience and broad approach to surgery best typifies him is attested to by the following entry in Garrison's *An Introduction to the History of Medicine*, comprising the only entry evaluating Agnew in this work: "one of the few surgeons who practiced medicine and surgery together" (16).

A great deal of information on Agnew as an operator is succinctly put by White (17):

> Dr. Agnew was naturally a quick operator, and his training dated back to the days when pre-anaesthetic traditions kept alive the theory that rapid surgery was good surgery, but he was above everything else, a safe operator, a precise operator.

Agnew, though not noted for his inventiveness,

> was always among the first to test new surgical procedures and to adopt them if they seemed to him consistent with fundamental principles and common sense. At a time when many of his juniors were skeptical as to the merits of antisepsis, or were even openly antagonistic, he gave it a thorough trial, and at once discarded in its favor the methods he had employed for forty years (17).

Agnew's more or less gradual withdrawal from academic life formally began at the beginning of 1889, shortly after his 70th birthday. He was made

Emeritus Professor of Surgery and Honorary Professor of Clinical Surgery, January 11, 1889. By the former position he was still a member of the Faculty with all its privileges; by the latter title—one never given before in the history of the University—he was enabled to deliver cliniques to the students whenever he so desired. This intention he carried out from time to time until within a short period before his death (9).

JOHN ASHHURST, JR. (1839–1900)

Ashhurst, the youngest recipient of this Chair, was only 49 when he was appointed in January, 1889. He had been Professor of Clinical Surgery since 1877, and by the time of his appointment as John Rhea Barton Professor of Surgery he had already made many major contributions to the literature, chief among which occurred in 1871, when

he brought out his own *Principles and Practice of Surgery*, one of the most valuable text-books on surgery, which went through six editions, and for many years was the recognized text-book not only at the University of Pennsylvania, but at many of the medical schools throughout the country (18).

His fame became international when in 1880–1886 he edited the six volume *International Encyclopedia of Surgery* (19).

Of the several accounts of Ashhurst's life, not one of them fails to remark on his erudition. For example, Packard (15) states that Ashhurst was "one of the most learned American surgeons." Ashhurst's claim as a bibliophile and scholar is attested to by realizing that at

the time of his death he possessed one of the most complete surgical libraries in the country, and, what was more, he was thoroughly conversant with what it contained, whether ancient or modern (18).

As a surgeon, "he never attempted brilliancy or rapidity" (18). As for his surgical interests, he became

surgeon to the Children's Hospital in 1870 and there made studies in bone surgery, especially excision of the larger joints, for which he acquired a considerable reputation. Later in life he devoted himself to the surgery of the large blood-vessels and to plastic surgery and was an authority in this domain (2b).

It has been said that Ashhurst "was sometimes criticized for his delay in accepting the so-called antiseptic method of surgical treatment" (18). One explanation for his hesitancy to accept the antiseptic method has been advanced:

Dr. Ashhurst was elected to the Chair of Clinical Surgery in 1877.... This was before the days of antiseptics, but ... the first thing that he did in taking charge of the ward was to redress and cleanse each case with his own hands.... Dr. Ashhurst's great surgical success depended not primarily on the operation, but upon the great personal care which he gave his cases from the time they came under his supervision until they were discharged (18).

His surgical career ended abruptly in August, 1898, as a result of a cerebral hemorrhage, which left him with a left hemiparalysis, although he remained intellectually clear until shortly before his death two years later, at the age of 60. In March, 1900, he resigned the Chair, effective August 31, 1900 (6c).

JAMES WILLIAM WHITE (1850–1916)

When White's term as John Rhea Barton Professor of Surgery began in September, 1900, he had spent the preceding 11 years as Professor of Clinical Surgery, and before that had been Clinical Professor of Genito-urinary Diseases, a department that he organized in 1886.

As was true with Ashhurst, White's most important literary contributions came before his appointment to this Chair. Of special interest for this paper is the text, *Genito-Urinary Surgery*, appearing in 1897 under the joint authorship of White and Edward Martin. He was also joint author with W. W. Keen of the *American Textbook of Surgery*, 1896, and Piersol's *Human Anatomy*, 1907 (11).

In the estimation of Dr. Alfred Stengel (2c), White's greatest service to the profession was his

lucid lectures and writing, which will be long remembered by his contemporaries and pupils and which will, undoubtedly, through the latter leave lasting impressions upon the surgery of the future.

The same author (2c) also felt that in

surgical literature his claim to originality will probably rest especially on "The Surgery of the Hypertrophied Prostate" which brought forward the idea of orchidectomy as a means of bringing about atrophy

of the prostate. Though this method has fallen into disuse, the thought underlying it, stimulated research in other directions regarding the effect of ablation of certain endocrine glands. In surgical practice he will be remembered chiefly as a careful diagnostician and as a cautious and successful, rather than brilliant, operator.

White is one of the two John Rhea Barton Professors of Surgery who have had full biographies published, and yet we are given no insight in Agnes Repplier's (20) *J. William White* into the circumstances surrounding his giving up of active surgical practice in 1906, and his resignation of this Chair in 1910. In this regard it is important to note that the year 1910 was one of major changes in the faculty of the School of Medicine. The circumstances surrounding these changes are too complex even to summarize in this brief paper, but it must be realized that there were national, local, and personal aspects to these changes. Abraham Flexner's explosive report, *Medical Education in the United States and Canada*, was focusing attention on all medical schools and faculties, and within the academic community of the University and School of Medicine there was not only disagreement on such fundamental issues as methods of teaching and the importance to be accorded medical research, but also strong interpersonal contests.

White resigned in the fall of 1910, shortly before his 60th birthday, his resignation to take effect January 1, 1911 (6d). Dr. A. C. Wood, White's first assistant and close associate for many years, states that although White's decision to resign the Chair was the result of various factors, the chief one was that he found his duties as John Rhea Barton Professor of Surgery interfering with his other varied interests, especially athletics.* Early in 1911 he was made a Trustee of the University, a position he held until his death in 1916.

EDWARD MARTIN (1859–1938)

Martin followed in the professorial footsteps of White, being Clinical Professor of Genito-urinary Diseases (1891–1900) and Professor of Clinical Surgery (1900–1910), before becoming John Rhea Barton Professor of Surgery, on January 1, 1911, at the age of 51.

As for his literary efforts, he

> was a prolific writer, being the author of several authoritative textbooks on surgical subjects, sections for medical systems, editor of the University Medical Magazine and Surgical Editor of The Therapeutic Gazette, as well as the author of innumerable papers read before various medical societies and associations (13).

Martin's response to the introduction of antisepsis has been well described by William Mayo (21):

> During the formative years of the nineties, Dr. Edward Martin was an exponent of the new knowledge. We see him changing enthusiastically but not recklessly from the old to the new, in his teaching careful to use the development of clinical medicine as the background for the application of the new, wisely judging, adapting, and applying advances in knowledge as they were brought out the world over.

As a lecturer and teacher he was very skillful. He pioneered the use of lantern slides and educational films (13).

As with White, Martin's resignation was the result of various factors, one important factor being the World War, for in 1917 and 1918 Martin spent much time in Georgia instructing surgeons for military duty. Early in the fall of 1918 the war showed signs of continuing for an indefinite period, and Martin felt that in the presence of the uncertainty of the war on the one hand, and his many civic and philanthropic interests on the other, the wisest move would be to resign the Chair.

Shortly after resigning he requested the Trustees give him some non-remunerative affiliation with the University, which would enable him to conduct and encourage surgical research. Since there was already a Chair of Surgical Research (held by Dr. J. E. Sweet), the Trustees created for him the title Emeritus Professor of Surgical Physiology (6e).

JOHN BLAIR DEAVER (1855–1931)

Not until he was 63 was Deaver elected John Rhea Barton Professor of Surgery, in October,

* Dr. Wood states that White on several occasions phrased the problem in terms of having to "give up surgery or give up golf" (personal communication).

1918 (6f). That so eminent a surgeon, whose first faculty appointment dated back to 1881, should fail to receive this appointment sooner may be accounted for as follows: Deaver worked in the Department of Anatomy from 1881 to 1899, conducting

> large and very successful quiz-classes in anatomy and in surgery; but when in 1899, his rival, J. William White, was given general charge of surgical instruction (during the last illness of Ashhurst), Deaver retired from the University until 1911, when he resumed teaching as Professor of Practice of Surgery (22).

After working at the German Hospital of Philadelphia (now Lankenau Hospital) for 10 years, Deaver became chief surgeon at that hospital in 1896.

> He rapidly built up a large clinic and entered upon the work of popularizing the new-found resources of surgery with all the enthusiasm of the evangelist. If from his many activities one might single out the most significant and important it would probably be the influence which he exerted in the spread of general knowledge and use of surgical therapy. . . . Especially was this true in acute abdominal conditions, notably appendicitis, with which his name became so inseparably associated as one of the pioneers (23).

As a surgeon, "Few, indeed, have been Deaver's equal, and it is doubtful if any have been his superior in the skillful use of what he was fond of calling the 'aseptic scalpel' " (23). A description of Deaver's operative clinics is given in a memoir of Deaver written by the son of Ashhurst (22):

> [Deaver] commenced his operations soon after noon, continuing until all the patients who had been scheduled had been operated on. This sometimes entailed as many as eighteen or twenty-four operations in one afternoon. It is true that he had his clinic so well organized that delays were almost unknown, and the facilities such that three or four operating tables might be in use at the same time.

Deaver had a histrionic flair, so that as a teacher he emphasized his points "by telling phrase and lucid demonstration holding throngs captivated, hour after hour in his clinic, where he was not wholly averse to 'playing to the gallery' " (22).

As for his retirement after only 4 years in the Chair, it must be remembered that he was 63 when he received the appointment, and "though the age limit for retirement was twice extended in his favor, in [June] 1922, he resigned all active duties at the University, retaining, however, until his death, the title of John Rhea Barton Emeritus Professor of Surgery" (22).

CHARLES HARRISON FRAZIER (1869–1936)

After spending over 20 years as Professor of Clinical Surgery, Frazier became John Rhea Barton Professor of Surgery, in July, 1922, at the age of 53. During most of the first half of his term as Professor of Clinical Surgery he also served as Dean of the School of Medicine (1902–1909), and he somehow managed to find time

> to carry out an increasingly heavy surgical practice, to establish and edit the University of Pennsylvania Medical Magazine, to establish one of the first laboratories of surgical pathology organized in this country, to lay the foundations for a department of research surgery, and, with Spiller, to carry on the experimental work on the treatment of trigeminal neuralgia which later made the surgical relief of this condition a safe procedure (24).

When Frazier became John Rhea Barton Professor of Surgery he instituted several broad revisions in the Department of Surgery. The clinical and research activities of the Department were brought into a closer relation than ever before, with mutual benefit and with benefit to the medical students. Every effort was made "to demonstrate not only the routine surgical procedures but to stress the physiologic, pathologic and physiochemical facts upon which such maneuvers are based" (24).

Frazier is the only John Rhea Barton Professor of Surgery who did not remain a general surgeon throughout his career.

> From about 1918 to the present day [1935] his entire surgical interest and life has been devoted to the cultivation of neurosurgery and he has been, in this country as well as throughout the world, one of the band of pioneers who have established this fruitful branch of surgery as a new field of medical science (25).

The briefest authoritative statement of his surgical contributions notes that his

> two outstanding achievements were his development of the surgery of the trigeminal nerve and section of the anterolateral columns of the spinal cord (cordotomy) for relief of pain. But his work on the surgery of the pituitary gland and on suture of the recurrent laryngeal nerve is important (14).

In regard to surgery of the trigeminal nerve, the technique of partial (*i.e.*, selective) retrogasserian neurotomy he developed and perfected in the early 1920's "has remained the safest and surest means of relieving trigeminal neuralgia" (26).

In 1934 he became a Trustee of the University of Pennsylvania. Early in 1935, a few months before he reached retirement age, his appointment to this Chair was extended for 2 years (6g). He died shortly after entering the second year of this period, having held the Chair for 14 years, longer than any other incumbent.

ELDRIDGE LYON ELIASON (1879–1950)

Eliason was 57 when he became John Rhea Barton Professor of Surgery in September, 1936, having spent the preceding 10 years as Professor of Clinical Surgery.

Though truly a general surgeon, Eliason had a particular interest and proficiency in the treatment of fractures, and in fact, his

> intimate knowledge of fractures was hardly equalled by any other surgeon of his time in Philadelphia. Familiar aphorisms of his concerning fractures are:
>
> "A fracture result should be evaluated by the result in life, limb function and contour in that order."
>
> "Treat the patient and not the film." . . .
>
> "Splint 'em where they lie" (27).

Although Eliason had many talents, he will be remembered primarily as "a great teacher and a sound clinician" (27). Since most of the articles on Eliason concentrate on these two intangible and personal characteristics, his chief contributions must have been along personal lines; more specifically, his lectures and his exemplary surgical care (28).

As a teacher, he was "splendid and stimulating, . . . [and] prepared his material for presentation in a manner which received widespread approval from his students" (27).

As a surgeon,

> he constantly made sure that what he did was a safe procedure. He was slow to accept new ideas and new techniques unless they were tried and proved. . . .
>
> [Also, he] was one of the first in Philadelphia to start programs of residency training in surgery, and his residencies were always recognized as ones which would train a man to be a practical surgeon (28).

Nursing education greatly interested him, and his book, *Surgical Nursing*, currently in its 9th edition (1950), "continues to be one of the best texts on that subject" (27).

Eliason reached retirement age in June, 1945, but when Dr. I. S. Ravdin was chosen to succeed him, Eliason agreed to stay on until Dr. Ravdin's return from military duty. Dr. Ravdin returned in October, 1945, and in November, 1945, Eliason became Emeritus John Rhea Barton Professor of Surgery.

ISIDOR SCHWANER RAVDIN (1894–)

With the assumption of the title John Rhea Barton Professor of Surgery in November, 1945, at the age of 51, Dr. I. S. Ravdin united for the first time under one person the clinical and research phases of surgery in the School of Medicine, thus achieving both formally and in effect what Frazier had long hoped to do.

A very brief résumé of some of the changes in the organization of the Department of Surgery under Frazier will aid in an appreciation of Dr. Ravdin's surgical contributions. Although Frazier did much to relate clinical and research surgery, his chief activity while head of the Department, as already stated, was neurosurgery, and it early fell to Dr. Ravdin to carry on much of the research activity. This role was formalized by his appointment in 1927 to the newly created J. William White Chair of Surgical Research* as Assistant

* This chair was set up in 1926 as one of the major bequests of J. William White. Although Dr. J. E. Sweet technically received the first appointment to this Chair, he resigned all his University appointments before the date on which his appointment to the White Chair became effective, hence Dr. Ravdin was the first to hold the J. William White Chair of Surgical Research.

Professor, and as Professor early in 1929 (6h). When the Harrison Department of Surgical Research was organized in 1936, Dr. Ravdin was made Director, and he was also appointed George Leib Harrison Professor of Surgery, the first instance in which two men were accorded the title Professor of Surgery in the School of Medicine at the same time (6i). In relation to each of these positions Dr. Ravdin has "discharged with great distinction a three-fold responsibility: that of the operating surgeon, that of a teacher, and that of a leader in physiological research in its relation to surgery." *

Anyone leafing through Dr. Ravdin's substantial bibliography of approximately 250 articles is impressed in two ways: first, by the extraordinarily wide range of topics, and second, by the varied and comprehensive approaches to many of these topics (*e.g.*, he has written authoritatively on almost every important phase of hepatobiliary disorders, including biochemical aspects, experimental aspects, diagnostic problems, operative technique, pre- and post-operative management, etc.). It is impossible to single out any one topic as his greatest interest or accomplishment, but certainly included among his major investigative contributions must be his work on the normal and pathologic physiology of the liver and biliary tract, and his work on plasma volume expanders and methods of extending the usefulness of whole blood.†

All the diversity manifested in his writings and teaching is a reflection of both the complexity of human disease and Dr. Ravdin's very broad concept of surgical care, which is that pre-operative and post-operative care of the patient is at least as important as the operative procedure itself. Once the patient's general condition is accepted as a major consideration in surgical care—greatly influencing rates of convalescence, morbidity, and mortality—then all endeavors to study the metabolic, electrolytic, endocrinologic, and other phases of pathologic physiology have a direct bearing on problems in clinical surgery.

Dr. Ravdin's industry and administrative genius are exemplified in his remarkable record during the second World War. In the spring of 1943, he was sent as chief surgeon (later, Commanding Officer) of the 20th General Hospital to Assam, India.

> What was initially a few rude buildings in a sea of mud grew to be an assemblage of 150 buildings, with adequate modern equipment, in a great field with surfaced roads, vegetable gardens and its own air field. In this hospital nearly 75,000 patients were cared for with a mortality of only 0.4%.‡

A more general statement on Dr. Ravdin's administrative abilities well characterizes the dynamic, interdependent relation between Dr. Ravdin and his co-workers:

> You will rightly insist that these achievements could not have been attained without the loyalty, resourcefulness and stamina of your staff; they, with equal right, will hold that your driving energy, human understanding and superb professional and executive capacity supplied the essential leadership.‡

Although much has been said about Dr. Ravdin in the above paragraphs, I have not even touched on entire phases of his surgical activities, such as his achievements as an operating surgeon, his many major advisory positions with key national and governmental organizations, his teaching and lecturing, and many others. I must leave to others more qualified to evaluate Dr. Ravdin's achievements than I the task of assigning to each of his many activities its relative importance.

V—SUMMARY

Even with this brief historical account of the John Rhea Barton Chair of Surgery, certain

* From citation accompanying conferring of honorary degree of Doctor of Laws, February 7, 1953, University of Pennsylvania. Not published.

† I am indebted to Dr. James M. Walker, present occupant of the J. William White Chair of Surgical Research, for some of the opinions expressed in this and the following paragraph.

‡ Unpublished citation for LL.D. for Dr. Ravdin.

general features about the Chair and its incumbents stand out. The Chair has been occupied by a succession of surgeons who have had national and frequently international reputations, and who have made substantial contributions to surgery. Although all the Professors were general surgeons (even Frazier, the only specialist, spent half his surgical career as a general surgeon), their varied surgical interests led to major contributions in such diverse fields as urology, neurosurgery, orthopedic surgery and fractures, and plastic surgery.

Characteristically their appointments to this Chair followed a long series of appointments in the School of Medicine. Stated another way, each John Rhea Barton Professor of Surgery had as his predecessor one of his teachers or colleagues, and as his successor a colleague or student. Although this situation lent an appreciable amount of academic continuity and relatedness to the succession of incumbents, by no means did it result in homogeneity or stereotyping of thinking or acting, for these men were in fact quite different from one another in terms of personality traits, surgical interests and techniques, and interests outside the field of surgery.

Note: I am much indebted to Drs. O. H. Perry Pepper, I. S. Ravdin, A. N. Richards, Roy G. Williams, and Alfred C. Wood for critically reading the manuscript in its next to final form.

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6b. *Ibid.*, **11:** 418, 421, 440.
6c. *Ibid.*, **14:** 8.
6d. *Ibid.*, **15:** 95.
6e. *Ibid.*, **17:** 134, 149, 165–166.
6f. *Ibid.*, **17:** 134–135.
6g. *Ibid.*, **22:** 106.
6h. *Ibid.*, **19:** 75, 210; **20:** 21.
6i. *Ibid.*, **22:** 284–285, 299.
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Memoir of Ralph Butler (1873–1954)*

By GEORGE M. COATES, M.D.

DR. RALPH BUTLER, an active Fellow of the College of Physicians of Philadelphia since 1906, died at his home in the Garden Court Apartments in West Philadelphia on March 3, 1954.

Dr. Butler was born in Loag in Chester County near the "Eagle"—thirty miles from Philadelphia—on July 24, 1873, the son of James and Rachael M. Butler, a well-known Chester County family, and in this beautiful rural country he spent his early years. There he attended the country schools until the age of sixteen. He then attended the West Chester State Normal School (now the State Teachers' College), from which he graduated with a degree of B.E. in 1893, and in medicine from the University of Pennsylvania Medical School in 1900. He served a rotating internship in St. Joseph's Hospital in Philadelphia and then began the study of laryngology in the University of Vienna in the noted clinics of Politzer, Chiari, Hajek, Alexander and the other famous teachers of the period.

Upon his return to America he began his teaching career in the Department of Otology in the University Hospital under B. Alexander Randall, then Professor of Otology in the University, where he advanced to the title of Assistant Professor before his retirement in 1926. About 1904, Dr. Butler became assistant to Dr. George C. Stout in the Department of Otology in the Philadelphia Polyclinic and College for Graduates in Medicine, starting as Instructor and advancing to Associate in the Polyclinic Otological Service of Dr. Walter Roberts. He shortly afterwards, in 1919, was elected Professor of Laryngology, and previous to that he was Chief of Otolaryngology in the German Hospital (now the Lankenau Hospital) and was for a time on the otolaryngological service of Dr. Walter Roberts in the Philadelphia General Hospital. He was for years Otologist to the Mary J. Drexel Home and Children's Hospital, and Consultant to the Women's Hospital, where his sister, Dr. Margaret Butler, was Chief of Otolaryngology. She was also Professor of Otolaryngology in the Women's Medical College of Pennsylvania, a distinguished otolaryngologist and a notable surgeon.

When the Graduate School of Medicine of the University of Pennsylvania was established in 1918 by the merger of the Medico-Chirurgical Medical School and the Philadelphia Polyclinic, Dr. Butler became Professor of Laryngology in the new institution, the major otolaryngological faculty of which consisted of Edward B. Gleason, Walter Roberts, Ross Hall Skillern, Ralph Butler, Arthur W. Watson, George B. Wood and George M. Coates. Dr. Butler also at this time became secretary to the otolaryngological faculty, of which Dr. Walter Roberts was later chairman, and Vice-Dean for Otolaryngology, a position for which he was eminently fitted.

Always courteous, quiet and understanding, he was a true gentleman, popular alike with students and his faculty colleagues. His service in organizing the new school, the curriculum of which was unique in the history of graduate teaching, was a great factor in its ultimate success. As a teacher he was outstanding, although he could never be induced to give a course of formal lectures. But in the clinic and operating room his great knowledge of his subject and his wide experience in otolaryngology, his patience and kindness, endeared him to his students and made him a most useful teacher. He was indeed an excellent clinician and a skillful and resourceful

* Read before the College of Physicians of Philadelphia, 6 April 1955. Prepared and published at the request of the Council of the College of Physicians of Philadelphia.

surgeon. He became Professor Emeritus in 1947.

While Dr. Butler was not a voluminous contributor to the literature of the specialty, his papers were always carefully thought out and well prepared.

In addition to his fellowship in the American Laryngological Association, he became, early in his career, a Fellow of the American Otological Society, of the American Laryngological, Rhinological and Otological Society and of the College of Physicians of Philadelphia, as well as a member of the Philadelphia Laryngological Society. He served as Clerk, and later Chairman, of the Section on Otolaryngology of the College of Physicians in 1930–32, and as President of the Philadelphia Laryngological Society in 1926–28. He was a Fellow of the American College of Surgeons, and, of course, a member of his county and state societies, and of the American Medical Association.

For recreation in his earlier days Dr. Butler played handball; he always kept himself in good physical condition canoeing and fishing. He belonged to the Presbyterian Church, and in politics was a Republican. He was also a Mason.

In 1905 Dr. Butler married Ida Shaw, who survives him.

Transactions of the Sections

SECTION ON GENERAL MEDICINE

24 January 1955

STOKES-ADAMS-MORGAGNI SYNDROME WITH ALTERNATING VENTRICULAR FIBRILLATION AND AURICULAR VENTRICULAR ASYSTOLE. Charles J. Schreader,* M.D., and Stanley Skromak, M.D. (Discusser: William G. Leaman, M.D.) (*Abstract 1, below*)

STUDIES IN MAN OF THE DUODENAL MECHANISM CONCERNED WITH GASTRIC MOTILITY. Stanley Lorber, M.D. and Harry Shay, M.D. (Discusser: J. Earl Thomas, M.D.) (*Abstract 2, below*)

EXPERIENCE WITH GROUP METHODS IN OBESITY. Thomas A. Pilla,* M.D. and Joseph Beardwood, M.D. (Discusser: Perry S. MacNeal, M.D.) (*Abstract 3, below*)

SIGNIFICANCE OF NORMOBLASTS IN THE PERIPHERAL BLOOD OF PATIENTS WITH CONGESTIVE HEART FAILURE. Louis H. Castor,* M.D., Solomon S. Mintz, M.D., Theodore H. Mendell, M.D. and Abraham M. Frumin,* M.D. (Discusser: Lawrence H. Beizer, M.D.) (*Abstract 4, below*)

28 February 1955

EFFECT OF BUERGER'S EXERCISES ON THE OXYGEN OF LIMBS WITH PERIPHERAL ARTERIAL DISEASE. Raymond Penneys, M.D. and David S. Wiltsie,* B.A. (Discusser: Meyer Naide, M.D.) (*Abstract 5, below*)

EFFECTS OF ACTH AND CORTISONE ON THORAZENE HEPATITIS. Joseph M. Gambescia, M.D. and Joseph E. Imbriglia, M.D. (Discusser: Henry J. Tumen, M.D.)

AGAMMAGLOBULINEMIA: REPORT OF A CASE IN AN ADULT. J. W. Savacool, M.D. and Ray P. Landes,* M.D. (Discusser: F. William Sunderman, M.D.) (*Abstract 6, below*)

PHILADELPHIA PULMONARY NEOPLASM RESEARCH PROJECT—INTERIM REPORT. Lieut. Thomas Nealon, Jr.,* (MC), U.S.N.R., K. R. Boucot, M.D., William Carnahan,* M.D., D. A. Cooper, M.D., D. J. Ottenberg,* M.D. and P. A. Theodos, M.D. (Discusser: Robert Horn, M.D.)

28 March 1955

THE SIGNIFICANCE OF CYANOSIS IN ACQUIRED VALVULAR HEART DISEASE. Daniel Marino,* M.D. and Harry Goldberg,* M.D. (Discusser: Raymond Penneys, M.D.)

DISSEMINATED LUPUS ERYTHEMATOSUS WITH CIRCULATING ANTICOAGULANT. Harold A. Hanno,* M.D. (Discusser: Lowell A. Erf, M.D.) (*Abstract 7, below*)

HEPATIC PORPHYRIA. F. William Sunderman, M.D. and F. William Sunderman, Jr.* (Discusser: Joseph V. Klauder, M.D. (*Abstract 8, below*)

HOMOZYGOUS HEMOGLOBIN C—CASE REPORT. Harry Gottlieb,* M.D., Elizabeth Mertens-Roesler, M.D., Jay Randolph Sharpsteen, III,* M.D. and Charles M. Thompson, M.D. (Discusser: David L. Drabkin,* M.D.) (*Abstract 9, below*)

23 May 1955

NEPHROCALCINOSIS WITH PARTICULAR REFERENCE TO CHRONIC GLOMERULONEPHRITIS. Walter L. Arons,* M.D. (Discusser: William E. Ehrich, M.D.)

THE USE OF I-131 IN CHRONIC PULMONARY INSUFFICIENCY. Benjamin M. Stout, Jr.,* M.D. and Henry P. Close,* M.D. (Discusser: Benjamin M. Stout, Jr.,* M.D.)

SOME OBSERVATIONS ON THE COMPLICATIONS OCCURRING IN PATIENTS WITH DIABETES MELLITUS. Perry S. MacNeal, M.D. and John D. Rogers,* M.D. (Discusser: G. G. Duncan, M.D.) (*Abstract 10, below*)

SECTION ON MEDICAL HISTORY

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STEPHEN GIRARD, A MEDICAL PARADOX. Frederic H. Leavitt, M.D.

DR. JOHN BROWNE, FRIEND OF BENJAMIN FRANKLIN. Fred B. Rogers,* M.D.

* By invitation.

The Fetal Monstrosity in Medical History. Louis Gerstley, III,* M.D.

21 April 1955

Biography versus History: with Special Reference to the History of Medicine.[1] Lloyd G. Stevenson,* M.D. (Kate Hurd Mead Class of 1888 Lecture in Medical History, Woman's Medical College of Pennsylvania)

SECTION ON OPHTHALMOLOGY[2]

20 January 1955

Case Report: Hydrops Corneae with Keratoconus. Jose Fiol-Bigas,* M.D.

Visual Screening in Schools. Samuel M. Diskan,* M.D.

Ocular Motor Manifestations of Central Nervous System Disease. Thomas B. Hedges,* M.D. and Francis Heed Adler, M.D.

Coats' Disease—A Clinical and Pathologic Study. William C. Frayer,* M.D. and Harold G. Scheie, M.D.

17 February 1955

Ocular Toxoplasmosis: Clinical and Experimental Observations. Michael J. Hogan,* M.D.

17 March 1955

The Diagnosis and Treatment of Some Interesting Lesions of the Limbus. Charles E. Iliff,* M.D.

21 April 1955

Elephantiasis Nostras—Case Report by Arthur Bobb, Jr. Glen Gibson, M.D.

Pituitary Apoplexy—Relief of Amblyopia by Prompt Surgical Intervention. Henry A. Shenkin,* M.D.

Tonography—Technical Difficulties and Control Studies. Robert W. Spencer,* M.D., Ernest D. Helmick, * M.D. and Harold G. Scheie, M.D.

[1] Printed in the *Transactions & Studies*, 4th Ser., vol. 23, no. 2, August, 1955.

[2] Abstracts of the presentations at this Section customarily appear in the *American Journal of Ophthalmology* and the *A.M.A. Archives of Ophthalmology*.

SECTION ON OTOLARYNGOLOGY[3]

19 January 1955

Eye Conditions Due to Nasal Pathology. Ramon Castroviejo,* M.D.

16 February 1955

Carcinoma of the Larynx and Bronchus: Report of a Case. Chevalier L. Jackson, M.D.

A Modification of the Endaural Mastoid Incision. David Myers, M.D. and Harold Wilf,* M.D.

Some Unusual Causes of Facial Paralysis. Austin T. Smith, M.D. and William H. Baltzell,* M.D.

A Ribbon Recorder for Use in Hearing Testing: from the Department of Otolaryngology of the Hospital of the University of Pennsylvania. Douglas Macfarlan, M.D.

20 April 1955

(Joint Meeting with the Section on Otolaryngology of the New York Academy of Medicine, held in New York. Speakers represent the New York Section, Discussers represent the Philadelphia Section)

Evolutionary Progress in the Surgery of Middle Ear Deafness. Julius Lempert, M.D. (Discusser: George M. Coates, M.D.)

Recent Advances in the Roentgen Diagnosis of Dysfunction of the Swallowing Mechanism as Result of Central Nervous System Lesions. Maxwell H. Poppel, M.D. and Harold G. Jacobson, M.D. (Discusser: Joseph Preston Atkins, M.D.)

SECTION ON PUBLIC HEALTH, PREVENTIVE AND INDUSTRIAL MEDICINE

23 March 1955

Panel Discussion on: Patient Care and Hospital Costs. W. Edward Chamberlain,

[3] Abstracts of the presentations at this Section customarily appear in the *A.M.A. Archives of Otolaryngology*.

M.D., Panel Chairman, Madison B. Brown,* M.D., Kendall A. Elsom, M.D., George A. Hay,* A.B., C. Rufus Rorem,* PH.D., and Louis H. Weiner, M.D.

Abstracts

Abstract 1

STOKES-ADAMS-MORGAGNI SYNDROME WITH ALTERNATING VENTRICULAR FIBRILLATION AND AURICULAR-VENTRICULAR ASYSTOLE. Charles J. Schreader, M.D. and Stanley J. Skromak, M.D.

Stokes-Adams-Morgagni syndrome has been the subject of intense medical interest and investigative study since its initial description. The many and varied arrhythmias and combinations of ectopic rhythms displayed by patients suffering from the syndrome, make each case a distinct entity.

The case here presented commanded interest of both clinician and electrocardiographer by the graphic display of alternating ventricular fibrillation and auricular-ventricular asystole. The patient was in a functionally adequate cardiovascular status until the toxic and anoxic effects of lobar pneumonia were added to the burden of the basic cardiac pathology.

In addition to the clinical and electrocardiographic features of the case discussed, it is noteworthy that the pathologic study of the heart revealed a distinct myocardial lesion. Despite the fact that there was a circumscribed area of hyalinized tissue in the conduction pathway, the coronary vessels were widely patent.

It is reasonable to suppose, then, that this patient had either a previous myocardial infarction with reestablishment of his coronary supply or a myocardial necrosis of different etiology. Despite this damage the patient was able to maintain adequate functional capacity until the onset of the pneumonia process. The anoxia associated, added to the increased cardiac work incident to infection, was sufficient to initiate the terminal series of events.

Abstract 2

STUDIES IN MAN OF THE DUODENAL MECHANISM CONCERNED WITH GASTRIC MOTILITY. Stanley H. Lorber, M.D. and Harry Shay, M.D.

Previous investigations of the duodenal mechanism involved the use of balloon-kymograph, tonometer, inductograph or roentgen techniques. The advantages of studying the antral-duodenal segment by a method which measures intraluminal pressures prompted us to reinvestigate this mechanism. Patients selected for this study had pernicious anemia with proven anacidity to histamine stimulation. Thus, we were able to avoid the influences of variations in duodenal pH that could be produced by the gastric secretion of acid.

The method employed was previously described by us. (Gastro. 27: 478, 1954) Pressures were recorded from the duodenal cap and gastric antrum. A third tube was employed for intraduodenal instillation of the test substances (1 to 2 cc. per minute for 10 minutes) which included 0.3% HCl, 1 and 5% $NaHCO_3$, 5 and 25% Glucose and Olive Oil.

Results: Instillation of 5% glucose was without effect. One per cent sodium bicarbonate resulted in an increase in frequency and height of pressure waves in 8 of 12 experiments but 5% $NaHCO_3$ was followed by depression or abolition of pressure waves in 5 of 8 subjects. 25% glucose had much the same depressive effect as 5% $NaHCO_3$ but olive oil uniformly abolished pressure wave activity. The latent period and duration of depression were longer after olive oil instillation than after HCl or the hypertonic solutions. In 41 of 46 experiments duodenal cap activity closely paralleled that of the antrum but in 5 instances cap activity was present when antral waves were abolished. These results substantiate the importance and sensitivity of the duodenal mechanism in controlling gastric motor activity.

Abstract 3

EXPERIENCE WITH GROUP METHODS IN OBESITY. Thomas A. Pilla, M.D. and Joseph Beardwood, M.D.

Within the last six years widespread interest has been shown in the use of group methods for weight reduction.

The program for the management of obesity at Abington Memorial Hospital under the direction of Dr. Joseph T. Beardwood, Jr., includes:

1. Obtaining sufficient background material from each patient, both historically and physically, and from a few simple laboratory tests available to most practitioners.

2. Giving the patient strong support, sufficient to keep his interest high and protect him against early discouragement.

3. Appreciating the possible psychogenic factors contributing to the patient's obesity but developing these slowly and atraumatically.

4. Showing the individual he is not alone in his constant struggle to lose weight but can share his experiences with others, and encourage him to ventilate more freely. Besides opportunities to discuss his problem with others, there should be intervals when he can review his progress directly with the doctor.

5. Minimizing the importance of vitamins, weight losing medications, thyroid drugs, unless in time the need for these is definitely indicated. Lessening the value of strenuous exercise, massages which are supposed to redistribute fat. Discussing and evaluating the reducing fads to which the individual is constantly exposed in current magazines and newspapers.

6. Altering eating habits over a period of months with the hope that a return to former excessive intake may be delayed indefinitely.

7. And lastly—giving the individual a positive approach to losing weight.

A differentiation should be made between group psychotherapy and "group methods" or "group programs". We agree with Harvey and Simmons that the use of the latter implies a salutary experience of recognition, discussion, information, acceptance, support and competition toward the same tangible goal. It is a voluntary, purposeful, social grouping. The group experience should be patterned and structured so that participants have some idea of what to expect, but should not be rigid and should allow time for free discussion of any tangential matter introduced by a member of the program.

Unlike some other groups we feel that a physician should be the leader rather than dietitians, social workers or educators.

Each member is given a printed roster of the program. This accurately specifies the time and place of each meeting, the subject to be discussed and the speaker. The sessions are held weekly over a three-month period.

The meeting place is also important. We avoid the repeated use of classrooms with rows of seats, nor do we recommend gathering around a table or having the doctor sit behind a desk. Rather we prefer to hold these group sessions in the informal surroundings of a lounge or living room.

Three years' experience utilizing group methods for weight reduction have led us to the following conclusions:

1. Groups should be small, usually no more than twelve people. If much larger it is difficult to manage and impossible to maintain adequate informality.

2. Unlike the Herrick Memorial Hospital project, we do not feel that anything is gained by attempting to achieve homogeneity with regard to background, occupation or activities of the members.

3. Our program is not covered by a grant, so each individual pays in advance, an over-all charge. Our results with a group which paid no fee were unsuccessful. Payment for the course is an obvious factor in promoting good attendance during the first few meetings, during that interval when the dynamics of the group method are being developed and are possibly not strong enough to guarantee faithful attendance. Later on in the program the enjoy-

ment and dependence of the individual on the weekly meetings becomes quite apparent and is enough to insure good attendance.

4. Though we feel that the program for weight reduction employing group methods should be patterned and structured, the topics discussed at each session are not presented in the form of a classroom lecture but rather are discussed with the group, with individual members participating. At times the discussion wanders far from the original subject but if it is of *general interest* to the group it is to be encouraged.

5. Although little has been said here about the psychiatric aspects of obesity, these factors are recognized from the beginning and are developed and enlarged upon as the program progresses from week to week. The participants are given insight into their eating habits and, toward the final sessions, discuss their problems more and more freely with the group members and the group leader.

The results of the program have been both encouraging and disappointing. We feel that the outlook for the overweight individual is still not an optimistic one, and like diabetes and hypertension and many other disease states, at least at the present time all we can do is manage the condition—we seldom cure it. It has been written frequently, when an obese individual reduces his weight he is still a thin obese person.

Abstract 4

SIGNIFICANCE OF NORMOBLASTS IN THE PERIPHERAL BLOOD OF PATIENTS WITH CONGESTIVE HEART FAILURE. Louis H. Castor, M.D., Solomon S. Mintz, M.D, Theodore H. Mendell, M.D. and Abraham M. Frumin, M.D

The poor prognosis attached to the presence of nucleated red cells in the peripheral blood smear of patients with congestive heart failure is not generally recognized. The few reports mentioning this finding have been restricted primarily to the hematological literature. Only 18 cases were reported prior to 1953 (1, 2, 3, 4). A more recent paper (5) presents 96 cases of which 41 % died shortly after their detection. We have been able to collect four such cases in three years at the Albert Einstein Medical Center, Southern Division. One patient had rheumatic heart disease, two had arteriosclerotic cardiovascular disease and the other had pulmonary heart disease. The cases are analyzed from the clinical, hematological and post mortem findings. Two of our patients died soon after the appearance of nucleated red cells in the peripheral smear; one died fifteen months later; and the other is still living eleven months later. These survival statistics compare favorably with those presented in previous reports.

The cause for this phenomenon is speculative. It may be seen in any type of cardiac disease. None of our patients were anemic. It seems to be commonly associated with the presence of thrombi and/or infarcts in the lesser circulation, but not necessarily so. Bone marrow aspirations performed on our patients showed no evidence of abnormal erythropoiesis with a normal E/M ratio being present. Careful post mortem examination did not reveal any evidence of extramedullary hematopoiesis in the liver or spleen. We feel that bone marrow anoxia may be a prime factor in the premature release of the nucleated red cells into the peripheral blood.

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Abstract 5

Effect of Buerger's Exercises on the Oxygen of Limbs with Peripheral Arterial Disease. Raymond Penneys, M.D. and David S. Wiltsie, B.A.

The skin oxygen tension of the feet was measured during Buerger's exercises to determine if such exercises are of value in the treatment of peripheral arterial disease. Only the "foot-down" position was studied since this is the actual therapeutic phase of the exercises. Skin oxygen was measured by the stationary platinum oxygen electrode (Davies and Brink, Rev. Scient. Instruments. 13: 524, 1942), several of which were inserted in the feet of patients with peripheral arteriosclerosis and in the feet of normal subjects. The foot was placed in the "down" position (legs dependent, subject sitting) for approximately 3 minutes and then returned to the "flat" position (legs flat, subject recumbent), for 3 minutes. This cycle was repeated several times in each experiment. The average skin oxygen tension was found to be approximately 70% greater while the feet were in the dependent position, both in the patients with arterial disease (13 experiments) and in the normal subjects (4 experiments). This increase in skin oxygen in the dependent position indicates that Buerger's exercises, like the head-up bed (Williams, Montgomery and Horwitz, J. Clin. Invest. 32: 1097, 1953) are of value in the treatment of peripheral arterial disease.

Abstract 6

Agammaglobulinemia: Report of a Case in an Adult. J. W. Savacool, M.D. and Ray P. Landes, M.D.

The case of a 38-year old male with absence of serum gamma globulin is reported. The patient had a history of recurrent infections with inability to react in a normal manner. During his adult life he had several such periods with respiratory infections but none as serious as those occurring during the year and a half prior to hospital study during which he was barely able to work. Finally he developed migrating and recurring pneumonia which failed to respond completely to antibiotic treatment and organized in his left lower lobe. Surgery was performed because of the failure to resolve and it was only after recovery that the agammaglobulinemia was discovered. He had low blood protein on 3 occasions with fairly normal albumin and a globulin ranging from 0.6 to 1.25 gm. per 100 ml. When the first adult case report of agammaglobulinemia appeared, the patient's serum was subjected to electrophoretic analysis and no gamma globulin was found.

The patient has been treated for six months with monthly injections of 36 ml. of pooled gamma globulin with the hope that the defect could at least in part be remedied by this method since several reports have suggested its efficacy. While the patient is much improved, subsequent electrophoretic analysis has failed to demonstrate significant change in the patient's gamma globulin.

Since the first report of this condition in an adult, at least ten cases have been described in recent publications. This would suggest that the condition is not rare and that it should be considered in patients with recurrent infections. Furthermore, several patients with agammaglobulinemia have had a sprue-like syndrome and a number have had splenomegaly. The implications of the problem are still expanding.

Lymphocytes and plasma cells have been suggested as the cells responsible for the formation of the blood globulins. Recent evidence suggests that the gamma globulins responsible for the protection against bacterial infections are formed by plasma cells.

The treatment of patients with known agammaglobulinemia must rely heavily on antibiotics. Since it is still uncertain whether gammaglobulin injection is useful or practical, antibiotic prophylaxis should be considered at least seasonally.

Abstract 7

Disseminated Lupus Erythematosus with Circulating Anticoagulant. Harold A. Hanno, M.D.

The diagnosis of disseminated lupus erythematosus was established in a 33-year-old

white married woman who was admitted to the Wills Eye Hospital with severe hypertension, a grade 4 retinopathy of recent onset and a history of arthritis and arthralgia of two years' duration. The arthritis had begun following the last of a series of five spontaneous abortions. Renal function was markedly impaired.

Despite the absence of any obvious bleeding manifestations, the venous blood drawn for laboratory studies failed to clot for as long as twenty-four hours. The patient showed consistent prolongation of bleeding time, coagulation time, and prothrombin time. The presence of a circulating anticoagulant was established by the demonstration that one part of the patient's plasma added to nineteen parts of normal plasma more than tripled the clotting time of the mixture. Protamine titration was negative for heparin or heparin-like substances. The patient's plasma showed definite antithromboplastin activity but no antithrombin activity.

Two previous cases of disseminated lupus erythematosus complicated by the presence of a circulating anticoagulant have been reported (1).

It is felt that the circulating anticoagulant in the case presented resulted from the underlying primary disease. However, because of the history of repeated abortions, it is conceivable, though less likely, that the circulating anticoagulant might have resulted from transplacental isoimmunization (2).

The problem of circulating anticoagulants is briefly reviewed.

The kindness and cooperation of Dr. Leandro M. Tocantins, in whose laboratory the special studies of the coagulation defect in this patient were performed, is gratefully acknowledged.

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Abstract 8

Hepatic Porphyria. F. William Sunderman, m.d. and F. William Sunderman, Jr.

The term "porphyria" is used to denote disease states in which relatively large amounts of uroporphyrins appear in the urine. These uroporphyrins may be excreted either preformed or as their precursor, porphobilinogen.

The porphyrias may be divided into two main groups: (1) erythropoietic and (2) hepatic. The hepatic porphyrias may be subdivided into three clinically recognizable types: paroxysmal, photosensitive and combined.

The clinical courses of three patients suffering from hepatic porphyria have been presented. The first, a young colored woman with *paroxysmal* porphyria had predominantly neurologic manifestations and died of respiratory paralysis. The second, a chronic alcoholic and syphilitic man with *photosensitive* porphyria, had predominantly dermatologic manifestations and achieved a remission of his disease. The third, a young white woman with *combined* hepatic porphyria manifested photosensitivity, neurologic symptoms and abdominal colic. She continues to suffer from exacerbations of her illness.

Abstract 9

Homozygous Hemoglobin C—Case Report. Harry Gottlieb, m.d., Elizabeth Mertens-Roesler, m.d., Jay Randolph Sharpsteen III, m.d., and Charles M. Thompson, m.d.

A patient admitted to the wards of the Philadelphia General Hospital recently proved to be homozygous for hemoglobin C.

H. B., an 18 year old negro male, was referred to the medical ward from the blood bank when it was noted that he was icteric.

He offered no complaints on admission. Questioning revealed that the presence of scleral icterus was first observed by a friend 18 months prior to admission. He had noticed during the past month that his stools and urine had become darker in color. Systemic review and past medical history were non-contributory.

Positive significant physical findings were: Marked scleral icterus, a liver palpable 2 cm.

below the costal margin and a spleen palpable 5 cm. below the costal margin.

Positive laboratory data: Hb. 13.9 grams; platelets 186,000; MCHC 32%; Reticulocytes 2.6–3.6%; Serum bilirubin 5.8 mgm.% Total—5.2 indirect and 0.6 direct; 2 hour urine urobilinogen 2.59 E.U.: Fecal urobilinogen 1533 E.U./24 hours.

Examination of blood smears showed 24% target cells, polychromatophilia, and cells with angular and boat shaped outlines.

Liver functions showed thymol turbidity 2.0, thymol flocculation 4+ and cephalin cholesterol flocculation 4+. Proteins, alkaline phosphatase and cholesterol were normal. Cholesterol esters and prothrombin time were 44%. Osmotic fragility was decreased. Mechanical fragility was 14%. Coombs test was negative. Liver biopsy showed hemosiderosis and periportal fibrosis. Bone marrow showed erythroid hyperplasia. Electrophoretic analysis showed 100% hemoglobin C.

Screening studies were done on H. B.'s mother and four siblings. Histories were completely negative. A spleen was barely palpable on one of the brothers. He was one of two siblings who was also found to have hemoglobin C in the homozygous state.

Abstract 10

THE COMPLICATIONS OF DIABETES MELLITUS.

Perry S. Mac Neal, M.D. and John Rogers, M.D.

A series of 103 patients from a Diabetic Clinic which attempts to achieve good chemical control of the patients with diabetes have been examined for the specific common complications of this disease. The incidence of these complications has been calculated and correlated with various factors, some pertinent and some, purposely, not pertinent. Our main purpose has been to present a system for the evaluation of these complications in the hope that if other similar groups can be classified in similar fashion a large enough group of patients can be gathered to allow positive conclusions.

Our series of cases has been too small to permit definite conclusions but the following statements appear justified:

1. The main factors in the development of vascular complications are the age of the patient and the duration of his diabetes.

2. In this group of patients the development of retinopathy was not prevented by perfect control but the retinopathy tended to be more severe among the patients who were poorly controlled.

3. Groups of patients who are relatively free from one vascular complication tend to be relatively free from the others.

A simple system of classifying diabetic patients has been suggested.

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Streptococcal Infection in Relation to Rheumatic Fever and Nephritis*[1]

By CHARLES H. RAMMELKAMP, JR., M.D.

STREPTOCOCCAL respiratory infections are caused by any of the various serological types of group A streptococci and only rarely are such infections due to organisms belonging to groups C and G (1). The importance of these infections is due not only to the high morbidity, but also to the occurrence of rheumatic fever and acute glomerulonephritis during the convalescent period. In this Alvarenga Lecture, it is a pleasure to have the opportunity to review some of the investigations conducted during the past several years at the Streptococcal Disease Laboratory.† These studies have emphasized the natural history of streptococcal infections, rheumatic fever and nephritis in the belief that an understanding of the disease process might assist in the development of rational procedures for the control and treatment of these disorders.

The primary reservoir for the group A streptococcus is the upper respiratory tract of man. In order for infection to spread the organism must be transmitted from this reservoir to a susceptible individual. In the past it has been assumed that transmission occurs by direct and indirect routes. By the direct route the streptococci are transferred by intimate contact or by droplets carried for short distances through the air. By the indirect route the organisms are carried on fomites, in dust, or in small droplet nuclei that circulate freely in the environment. These methods of transmission are well known and have been considered important in the spread of most respiratory diseases. However, there is actually little direct evidence indicating that streptococci transmitted by any of these pathways produce disease, and there is certainly no quantitative study defining the relative importance of each method of transfer.

Circumstantial evidence appears to be the basis for the emphasis placed on the role of

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indirect pathways in the transmission of respiratory disease. Thus, in the case of streptococcal infections, it is well established that the specific organism can be isolated from clothing, bedding, books, dust and other articles in the immediate surroundings of a patient with streptococcal tonsillitis (2). Likewise, in military barracks where epidemics are in progress cultures of the air show large numbers of streptococci especially during periods of bed-making and sweeping. Since the streptococci recovered from these environmental reservoirs are viable, it was logical to conclude that indirect pathways of transmission might be important in the spread of disease. During the past two decades efforts to control respiratory disease have been directed toward the development of methods for sterilization of these environmental reservoirs. The use of ultraviolet light, bactericidal vapors and the application of oil to floors, bedding and clothing have not resulted in a dramatic decrease in disease rates (3), indicating that present concepts of the mode of transmission of respiratory infections require revision.

Beginning in 1950 a study of the spread of streptococcal infections was instituted in a military population.* As the first step it was necessary to determine where effective contacts occurred in this population. The results showed that the living quarters was an important focus for the spread of disease and in this respect the barrack was similar to the home in civilian populations (4, 5). Preliminary analysis of the geographical pattern of spread of streptococcal disease within the barracks showed that the risk of infection was related to the distance an individual slept from a known carrier (4). If these results are confirmed, they would indicate that droplet nuclei are not a primary source of infection. The observed pattern of infection could be explained by transmission of the organism by direct or intimate contact or by contact with contaminated bedding and dust in the immediate surroundings of the carrier.

The experimental approach to this problem was facilitated by a normal military procedure which has been practiced for years. Ordinarily, when a soldier becomes ill and requires hospitalization, his bedding is returned to the supply sergeant. This bedding is then reissued to the next man assigned to the squadron. Preliminary studies showed that blankets turned in by individuals with streptococcal sore throat were contaminated with large numbers of streptococci of the same serological type responsible for the illness. All that was required to study the infectious nature of contaminated bedding was to follow the recipient of the sergeant's gift of three streptococcal blankets. As a control the physicians issued clean blankets to other soldiers living in the barracks.

In the actual study clean or naturally contaminated blankets were issued to individuals who were known to carry no group A streptococci. Following receipt of the blankets the nose and throat were cultured daily and a record of respiratory symptoms maintained. The results showed that the risk of infection with group A streptococci was actually greater in those soldiers who received clean blankets compared to those with contaminated bedding. Furthermore, since the serological type of streptococcus causing the infection in both the donor and the recipient was known and multiple colonies isolated from the blanket had been identified serologically, it was possible to define the risk exactly. In a total experience of over 1,000 man-day risks to contaminated blankets, only three infections were encountered in the recipient which were due to a serological type present in the contaminated blankets. It was concluded that contaminated bedding does not serve as an important source of infections, and indeed, it is doubtful that such articles ever serve as a vehicle for transmission of this respiratory disease.

Similar studies were conducted with con-

* Dr. Lewis W. Wannamaker was largely responsible for these studies. He was ably assisted by other members of the staff, particularly F. W. Denny, Jr., H. B. Houser, W. D. Perry and A. C. Siegel.

taminated dust collected from barracks where epidemics due to several different serological types were in progress. Volunteers were inoculated intranasally with samples of dust known to contain from 1,800 to 42,000 viable organisms. In no instance was an infection produced. Only when the secretions from patients with streptococcal infections were added directly to dust and the mixture then inoculated before the sample was dry were infections produced in man. Under ordinary circumstances, therefore, the resuspension of naturally contaminated dust into the environment does not serve as an important source of respiratory infections.

In summary, the observed pattern of spread of streptococcal infections is best explained by direct transmission of the infecting agent. No evidence was obtained that indicated environmental reservoirs were important. These results are consistent with the reported lack of effect of control measures designed to decrease the possibility of infection by the indirect or airborne routes (3). Apparently streptococci deposited in the environment are dried rapidly, and under these conditions the organism, although still viable, is unable to establish itself in the respiratory tract of man. In attempting to control these bacterial infections, it would appear more profitable to focus future efforts on the host which would include both the carriers of the streptococcus and the individuals exposed to them. Today, it is possible to eradicate the organism from the majority of carriers as well as to alter the susceptibility of the recipient. In both instances this is best accomplished by the use of penicillin. In the future it is possible that other methods for altering the susceptibility of man to streptococcal infections will be developed.

Following infection, the acute symptoms of streptococcal sore throat develop rapidly. When no therapy is administered, approximately half of the patients are well by the fifth day, and by the seventh day of illness few patients still exhibit symptoms. Those patients who do not recover immediately usually have developed suppurative complications such as sinusitis, otitis media, or peritonsillar cellulitis. These complications are especially prone to occur in those individuals whose tonsils and adenoids have not been removed surgically.

The most intriguing features of the streptococcal illness are the so-called non-suppurative complications which include rheumatic fever and glomerulonephritis. Within the past several decades the relationship of group A streptococcal infection to these complications has been clearly established. However, the mechanism by which the streptococcus produces these diseases remains to be determined.

Rheumatic fever regularly develops in 3 per cent of individuals with streptococcal infections (6). It is important to emphasize that the evidence supporting this statement is limited. In all reported studies the population groups included mostly older children or young adults who either exhibited scarlet fever or tonsillitis and pharyngitis acquired during an epidemic (6). No studies of very mild or inapparent infections have been reported, although it is well established that an attack of rheumatic fever may be precipitated by infection which produces no symptoms. Furthermore, attacks of acute rheumatic fever are rare below the age of five, and yet infants do develop respiratory infections due to the group A streptococcus (7). It would be important to know whether the first experience with the streptococcus ever leads to an attack of rheumatic fever.

The attack rate is known to be altered under one circumstance, namely, a rheumatic experience confers on the individual a markedly increased susceptibility (8). There is some reason to believe that several weeks are required before maximal susceptibility is reached and several years for such susceptibility to decline. Even after five or ten years the attack rate following a streptococcal infection is greater than observed in the normal population. This reaction of the rheumatic individual to the streptococcus is reminiscent of the reaction of the host to an antigen previously

experienced. It has been stated that increased susceptibility is also conferred by inheritance, since multiple cases are observed in the family unit (9). However, Stetson (10) has shown that when siblings of rheumatic subjects or children of rheumatic parents acquire a streptococcal infection away from their home environment, the attack rate is not increased. Thus, some explanation other than increased susceptibility to acute rheumatic fever may be responsible for familial concentrations.

Occasionally, the response of the individual to preventive or therapeutic measures assists the investigator in the elucidation of the pathogenesis of disease. The continuous administration of sulfadiazine to rheumatic subjects and to military populations prevents streptococcal infections and rheumatic fever. Although these results again emphasize the etiological role of group A streptococci in the production of rheumatic fever, they add little to our knowledge of the pathogenesis of this complication. In contrast, the fact that treatment of the streptococcal illness with sulfadiazine does not prevent the development of a rheumatic attack subsequently served as a valuable clue in the study of the pathogenesis of this complication.

Following the introduction of penicillin, Massel (11) used this compound for the treatment of streptococcal infections in rheumatic subjects. Such therapy prevented recurrences of rheumatic fever. Similar results were reported by Denny (12) in the general population where penicillin therapy of streptococcal infections reduced the incidence of rheumatic fever by 90 per cent. These results are interesting since both penicillin and sulfonamides are about equally effective in alleviating the symptoms of the acute streptococcal infection, but only penicillin prevents rheumatic fever. The obvious difference between the compounds is that sulfadiazine is bacteriostatic whereas penicillin is bactericidal for group A streptococci.

The importance of the living streptococcus in the pathogenesis of rheumatic fever was not appreciated for several years. As experience accumulated, it was observed that therapy of the streptococcal infection with penicillin or with the broad spectrum antibiotics did not always prevent the development of rheumatic attacks. Analysis of these therapeutic failures showed that in the majority of instances the group A streptococcus had not been eradicated. Indeed, any form of therapy which fails to eliminate these organisms does not alter the attack rate of rheumatic fever appreciably. Apparently this fact is responsible for the failure of sulfonamide therapy of acute streptococcal infections to alter the incidence of rheumatic attacks.

The importance of the actively metabolizing streptococcus is emphasized further by the observation that eradication of the streptococcus as late as nine days after the onset of the acute respiratory illness results in a markedly decreased incidence of rheumatic fever (13). This therapy is effective even though the antibody response to the infection is not altered greatly. Thus, it would appear that either the streptococcus itself or some product which is being continuously produced is required for the development of rheumatic symptoms (Fig. 1.).

Support for the concept that the streptococcus itself is responsible for valvular heart disease is obtained from the studies of Green (14) who cultured group A streptococci from the valves of eight of nine patients dying during an attack of acute rheumatic fever. These results have been partially confirmed by three other investigators (15–17). There is no direct evidence indicating that streptococci become lodged in the joint tissues and produce arthritis.

An alternative theory which might explain the pathogenesis of carditis and arthritis would be that the organism residing in the pharynx produced a substance which reacts in some unknown manner with the tissues of the heart and joints producing the typical inflammatory reaction. This reaction does not develop immediately, and therefore the idea of a union of an antigen with a specific anti-

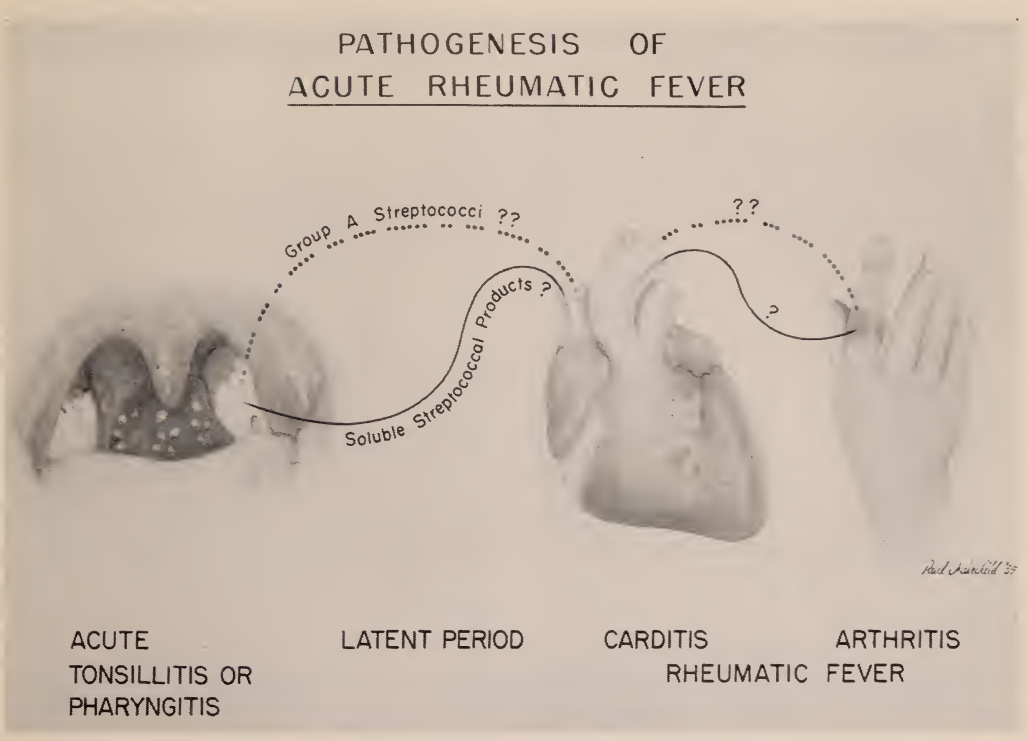

Fig. 1. Pathogenesis of Acute Rheumatic Fever.

body becomes an attractive hypothesis. *In any event, the living streptococcus is required, and any measure employed by the physician to prevent infection or to eradicate the streptococcus may be expected to alter the incidence or degree of rheumatic valvular heart disease.*

In contrast to rheumatic fever, acute glomerulonephritis is rarely observed after most streptococcal infections, and the attack rate is certainly not constant. Indeed, it was this variability in the attack rate which suggested that only a few strains of streptococci were capable of producing nephritis. Today, it is known that group A streptococci belonging to serological types 12, 4 and perhaps 25 are associated with infections followed by acute glomerulonephritis (18).* In addition, a strain named Red Lake, representing a new serological type, has been observed to cause scarlet fever and nephritis (19). One of the interesting and unexplained features of infection caused by these nephritogenic strains is that the attack rate of nephritis is not constant.

The elucidation of the causes for this variable reaction on the kidney produced by different strains of nephritogenic streptococci may alter our concepts of the pathogenesis of nephritis. For example, in one study of a type 12 epidemic, hematuria of a mild degree was especially likely to occur during the first few days of the acute respiratory infection in those individuals who subsequently developed acute glomerulonephritis (20). If this observation is confirmed, and especially if the initial hematuria is greater in epidemics which are followed by a high incidence of nephritis, then one must consider nephritis as being the result of a product of the streptococcus which acts directly on the glomerulus. At the present time, this explanation is not entirely satisfactory, because the initial phase of increased red cell excretion disappears before symptoms and signs of nephritis develop.

Since rheumatic fever and acute nephritis have been thought to be caused by a similar

* Strains from cases 19 and 20 (18) were reported as type 18. Subsequent studies showed these streptococci were type 4.

mechanism, one might expect the attack rate for rheumatic fever in patients with nephritis to be greater than normal and vice versa. Since the attack rate for rheumatic fever is not increased in those who develop nephritis compared to those who fail to develop kidney complications following a type 12 infection, it would appear that the same host factor may not be operative in both diseases (20). The fact that the nephritic patient is not especially susceptible to recurrent attacks is another point differentiating the two diseases.

Too much emphasis should not be placed on this latter difference because the chances of infection with a nephritogenic strain must not be great. Furthermore, the patient who has had one attack of nephritis is presumably immune to reinfection by at least one nephritogenic type (21).

One of the most striking features of nephritis, in contrast to rheumatic fever, is the absence of chronic and continuing tissue reactions in the involved organ. Rheumatic fever is essentially a chronic disease leading to marked anatomical deformities of the valvular structures. In the majority of patients with acute nephritis secondary to infection with the streptococcus, the acute phase of the disease is followed by complete recovery. This may indicate that rheumatic fever and nephritis are produced by different mechanisms. Unfortunately, it is not possible to state with certainty that acute nephritis does not lead to chronic anatomical changes in the glomerulus. Many clinicians believe that chronic glomerulonephritis is a relatively common sequela of the acute attack. Further studies of the natural history of nephritis, including biopsy specimens of the kidney, will be required before this question can be answered in a satisfactory manner.

In conclusion, as a result of recent studies of the natural history of streptococcal infections, present concepts concerning the prevention, treatment and pathogenesis of rheumatic fever and nephritis have been altered. Attempts to control the spread of streptococcal infections should be directed toward the elimination of the carrier state and the modification of the susceptibility of the host. Environmental reservoirs and indirect pathways of transmission of the organism are not important in the spread of streptococcal respiratory disease.

These investigations have placed an increased emphasis on the role of the living streptococcus in the pathogenesis of the non-suppurative complications, acute rheumatic fever and acute glomerulonephritis. The incidence of both complications can be decreased by the proper treatment of the respiratory infection. In addition, until definitive studies are available, the streptococcus should be eliminated from the patient with rheumatic fever or nephritis under the assumption that eradication of the organism may alter in a favorable fashion the evolution of cardiac and renal damage respectively.

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The Utilization of Psychiatric Services in the Schools[1]

By FRANK J. O'BRIEN[2], M.D., PH.D., D.ED.

FIRST, may I express my sincere appreciation for the honor you have conferred upon me by your invitation to address you this evening. It is a distinct privilege to be asked to present a paper on this occasion that is dedicated to the memory of Dr. James M. Anders, a physician whose almost innumerable contributions to the practice of medicine, public health, preventive and industrial medicine are beacon lights in the annals of medical history, not only in Philadelphia and Pennsylvania, but in the United States.

Philadelphia, for almost two hundred years, has been one of the most important centers of medical education in our country, and graduates of its medical schools, during this long period, have always been leaders in the continuous advances in the arts and sciences that contribute basically to, or which constitute medical training, medical practice, postgraduate training and research. It is indeed a distinct honor also to be asked to speak before your honored College in the City of Brotherly Love, where the first medical school in the United States was established in 1765, and I wish to express my sincere thanks to the officers and members of the College of Physicians of Philadelphia.

For the purpose of discussion this evening we will consider the word "modern," to be implied in the title of the address that I was asked to present to you, as representing approximately that era which starts at the beginning of this present century and extends up to the present. During this period of something over fifty years, a great deal that is very much worthwhile has been achieved in both psychiatry and education. One does not have to pierce, mentally, too far into the recesses of the past to recall that era in the history of the care of the mentally ill, when the so-called understanding of the mentally sick was characterized, for the most part, by ignorance, superstition and fear. As an almost natural consequence of this very unhealthy and detrimental attitude, the actual care of the mentally sick was characterized by and consisted almost exclusively of the use of physical restraint and punishment. The prevention and treatment of mental sickness, as we know such programs today, for all practical purposes, were non-existent. During this period in its history, therefore, psychiatry, even if requested by another profession such as education, to cooperate with it, could not have done so, because it would have had little or nothing constructively to contribute to any aspect of health and certainly not to any preventive program in another profession such as education.

However, during this same span of about fifty years many extraordinary advances had taken place in psychiatry. Previous to and in the early part of this period of psychiatric growth, the emphasis was placed chiefly on seeking to discover the nature of the causes of mental diseases and methods of treating them by investigating all physical and organic possibilities. Later, the pendulum of interest and emphasis swung to the psychological factors of mental disease and mental health. This aspect of psychiatric history was dominated, to a large degree and for a relatively long time, by a strong interest in psychodynamics and, as a result, by the ascendancy of the several psychoanalytic schools, most,

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if not all of which, directly or indirectly, had their impetus, if not their actual roots, in the epoch-making contributions of Freud.

In between and, in part, accompanying these two very distinct phases of psychiatric development, serious attention was given also to the nature and significance of the role played by the individual's total environment upon the development of his total health and also in the production of mental illness. Although the enthusiasts, in each of these major approaches, were without doubt motivated by a serious desire to discover and understand the causes and learn how to treat mental diseases better and to promote mental health, some of them assumed a professional air of superiority, condescension and intolerance toward those of their colleagues, who did not espouse their tenets, some of which the latter considered to be unscientific, others to be emotionally determined, repulsive, repelling or for other similar reasons, unacceptable. These negative reactions were produced especially in those whose broad clinical experience, professional insights and emotional maturity were such that they were not impelled to seek the bizarre or fantastic as a means of refurbishing their own personal and professional insecurities.

In spite of the adverse influences exerted by the theories and practices of such extremists, not only upon members of the profession itself but upon the laity as well, the contributions that the psychological approach to the understanding and treatment of mental illness ultimately made, represent one of the most fruitful epochs in the history of the diagnosis, care and treatment of the mentally ill. However, whether any actual progress has been made in the prevention of many types of mental disease, by this or any other approach is still very questionable and remains to be demonstrated.

It was ultimately recognized by the thoughtful exponents of these independent and, at times, competitive schools of thought, that each approach—the physical and organic, psychological and environmental,—had a very vital contribution to make in its own sphere. However, due to the complex nature of the human being, the over-all effectiveness of psychiatry, to be substantial and enduring, must necessarily represent the maximum contribution of all approaches, through thoughtfully considered and effectively executed and integrated programs of evaluation and treatment.

One conclusion of major concern to us in connection with the topic of our discussion this evening, that was drawn from the various experiments, research studies and clinical experiences, during this period of fifty-odd years is the conviction that a preventive program in the broad field of mental health that is to hold out any great hope for success must be concerned primarily with children.

The state mental hygiene surveys that were conducted by the then National Committee for Mental Hygiene and the Commonwealth Fund, under the inspired leadership and able direction of Dr. V. V. Anderson, the earlier work of Healy and Bronner and other similar programs, contributed especially to this conclusion. As a result of these and other like experiences, the Child Guidance Movement that represents an important part in the broad mental health field came into being.

Due to these and other developments of this type, psychiatry had reached a peak of both theoretical and technical competency that enabled it to provide a large amount of the specialized assistance, the need for which had been recognized by education, which had also reached a comparable stage of professional maturity.

Clinical psychology and psychiatric social work were also passing through comparable stages of professional growth, with the result that these two professions, from the very beginning, became senior partners, with child psychiatry, of the child guidance clinical team.

During this same period education which had been previously concerned almost exclusively with the teaching and learning of subject matter, now became interested in the

child—the complete child. Probably the only exception to this earlier and very restricted concept of education was to be found in parochial education, where the basic importance of religious and moral principles in personality development and in the motivation and direction of conduct were included and strongly emphasized.

Up to the turn of the present century total health—one of, if not the most precious possession of every child or adult for that matter—had not been, in most of its several aspects, a matter of interest or concern to the leaders in public education. In fact, even in this year of 1955, health education, in most school systems throughout the country, does not enjoy the recognition or position in the total family of educational subjects that is accorded even to many electives. This is surely true, if the importance of health teaching is to be judged by such criteria as the requirements of special preparation and demonstrated competency on the part of the health education teacher and the allocation of at least the minimum amount of instructional time that is necessary to make possible the proper and effective instruction in the broad area of health.

Consequently, even today, physical health, which is better understood generally than moral, social or mental health, does not receive the practical consideration that it warrants and must have, if education is effectively to discharge its important function in helping each child attain his maximum potential in total health and, therefore, in the healthy development of his total personality.

The reason for this limited educational perspective is to be found in the implication, if not the actual belief intrinsic in so-called "traditional education", up to very recently at least, that the mere acquisition of factual information and this only, constitutes a completely reliable guarantee that the individual is not only an "educated person" but that he will invariably use the knowledge and skills that he has obtained through these educational experiences for his own best interests and those of his family, community and country. Of course, nothing could be further from the truth. There are indeed numerous examples of individuals, who were the beneficiaries of all the advantages our educational institutions had to offer, including those of higher learning, who not only were unable to put the knowledge and skills they had gained to fruitful purposes, but who, in fact, used the very high degree of natural intellectual endowment which was given them by their Creator, and the vast store of knowledge they acquired in our schools and colleges, not only for their own disadvantage, but also to destroy many of the most cherished possessions and ideals of their own families, friends and citizens.

Inherent also in that philosophy of education that almost deified the mere possession of knowledge, per se, was also the implication, if not the actual belief, that in the process of acquiring factual information the remaining and larger aspects of the complex human personality would be receiving, in some mysterious but unexplained way, the proper motivation, direction and nourishment they required to achieve and maintain a necessary level of total health.

It might also be pointed out, in passing, that it was commonly claimed by its exponents that, regardless of any possible limitations, so-called "traditional education" was concerned primarily with and was successful in the training of the intellect. However, the actual truth is that, with one or two exceptions, it did not achieve even this limited goal. With the exception, perhaps, of the intellectual discipline that is inherent in the training in logic and the sciences the older form of education, whether its practitioners were aware of it or not, concerned itself almost entirely with the development of memory.

All the evidences of sick humanity that are so numerous in our society constitute irrefutable evidence that there exists now and has for a long time an urgent need for a kind of an educational philosophy and practice that is

predicated upon the total child. This conclusion is a most compelling one, if modern education is to be able to aid increasingly larger numbers of children while they are in our schools and later, when they are expected to assume their responsibilities as adults, to lead more healthy and satisfying lives personally and become more socially valuable, productive and acceptable citizens of our free society.

This conviction and insistence on the added obligations that modern education must be expected to assume, if it is to discharge its uniquely important responsibilities toward children and society, is not intended to contain even the suggestion that education is, or ever could have been responsible, as is so frequently and unjustly charged, for all or even most of the ills that beset or have beset our children in particular and mankind in general. However, education does have a very important and a generally recognized part, but it cannot be too often or too strongly emphasized that it is only a part, of the complete responsibility for the total well-being and healthy development of children. The fact is that even if it should attempt to do so, education could not successfully substitute its important, but nevertheless limited contributions for all or even most of the other and, in some instances, even more valuable ones that are or should be made by home training and by the successful inculcation in children by parents and religious teachers of the basic importance and indispensable power of moral principles and religious convictions on the healthy development of the total personality of each individual.

In the process of attempting to achieve this much more vital and more difficult objective, educational leaders have come to recognize that they, singlehanded and alone, are incapable of doing so. They recognize that if they have any hope of successfully accomplishing their new, more difficult and meaningful goal, the cooperation and special assistance of all others, who, in any way, can or should contribute to the total health and well-being of children, are absolutely indispensable. Consequently, thoughtful leaders in education have been seeking, especially during recent years, the help and active cooperation of such individuals and groups as parents, religious leaders, physicians in the several branches of medicine, courts, health, recreational, child and family care specialists.

These same goals are accepted and sought equally by the leaders of the medical profession.

As the human being is a spiritual, as well as a physical, emotional, social and intellectual being, as has been indicated earlier, his moral and spiritual strivings and needs must be of as much concern to the psychiatrist as they are to parents and religious leaders. To make this very fundamental contribution to the cooperative education or re-education of children the psychiatrist and all other members of the clinic team, as well, must believe in the existence and vital influence of a Divine Being and, therefore, in the indispensable importance of the individual's spiritual life. A clinical point of view and technical procedures that preclude the practical recognition and acceptance of the existence and fundamental importance of spiritual and moral values, which are predicated upon a belief in the existence of a Divine Being, in motivating conduct and, therefore, in contributing basically to the healthy or unhealthy structure and functioning of the individual's total personality, are materialistic, mechanistic and irreligious. Furthermore, such an unscientific approach to the understanding and treatment of children and adults constitutes a destructive and inexcusable attempt to reduce the inherent nobility, as well as the complexities and healthy functioning of man's spiritual, physical, conscious and unconscious life to the level of a purely mechanistic machine that is subject only to and controlled by the laws of physics and chemistry. Such a deflection from the known facts concerning man's unique spiritual nature is as regrettable as it is inexcusable.

Thus, the importance of making certain

that a continuously increased number of individuals are helped, through constructive educational training and social experiences that encompass each child's common and special limitations and abilities, is becoming increasingly clearer. This challenge to education must be answered favorably and without reservation or excuses if our children of today, who are the adults of tomorrow, are to acquire those qualities of character, personality and total health that are indispensable in fashioning totally healthy individuals and competent citizens. If he is to be able to achieve even minimum success in our present culture that is producing in large numbers of people of all ages, of all socio-economic conditions and ethnic backgrounds, very unhealthy and destructive effects that are evidenced by an increasing number and severity of such unhealthy mental phenomena as conflicts, tensions, anxieties, fears, insecurities and hostilities, each individual must be given every assistance possible, especially during the years of childhood and youth when the foundation of character and total health is being formed and developed.

One serious result of our present highly scientific age and increased speed of living is that the mental health of an increasingly large number of individuals is becoming more and more characterized by a larger number of, and more handicapping, conflicts, anxieties, fears and hates and, at the same time, by a woeful lack of the application of spiritual and moral values in almost every aspect of our community life. In this conflicting and unhealthy social atmosphere it has become increasingly more difficult to aid children to develop a total health status that is more nearly commensurate with their innate potentialities because these efforts are being constantly thwarted by many adverse conditions in their rapidly changing and increasingly immoral or unmoral environment. For this reason the ability and the will to contribute and cooperate in the complex program of educating children constitute both a challenge and a responsibility to all who are honestly concerned in any way with our youth, their future, and at the same time with the ultimate preservation of our American Way of Life.

Up to this point we have reviewed briefly some of the more important reasons why psychiatry and modern education should be and are able to work together for a common purpose; why almost unavoidable mistakes have been made within each of the two professions while their representatives were learning how to contribute to the growth of their respective professions, and, at the same time, to help discover ways and means of developing a valuable and permanent partnership. Finally, why such defects, deficiencies and errors, in thought and action, that had occurred during this period of professional growth are more or less natural in any such enterprise, and therefore are apt to be expected rather than resented. We will now consider some of the more important contributions that have been made by child psychiatry to modern education.

Some of the ways in which psychiatry can make, and in some communities is making, valuable contributions to modern education are the following:

1.0.0 *Clinic Services.* One of the major offerings that can be rightfully expected of a child psychiatrist or child guidance service, whether it is an integral part of a school system or has a cooperative working agreement with one, is the examination and treatment of children and the giving of practical advice, especially to parents, teachers and school administrators about helping children who present emotional, social or learning problems. In addition, the clinical program should be aimed also, as far as is humanly possible, at assisting the so-called "average" or "normal" child from developing handicapping and otherwise unhealthy emotional experiences, thinking and conduct habits. This latter effort represents the ideal aspect of a preventive program.

1.1.0 *Reasons for Referral of Children.* There is not time this evening to discuss even briefly

the many reasons why children are referred by a pedagogical staff to a child guidance service. For practical purposes they may be classified under three general headings:

a. Personality deviations
b. Problems in learning
c. Undesirable conduct patterns.

Due to the limitation of time and because as physicians you are better acquainted with the nature of personality and conduct disorders it is desirable to confine the discussion of reasons for referral to an analysis of some of the problems in the area of learning.

1.1.1 *Problems in Learning.* The older and so-called "traditional" type of education was based, at least in part, upon the underlying theory of the "Behavioristic School of Psychology", namely, on the "stimulus-response" principle. It was assumed evidently that, if the child were given the accepted training, e.g., in the basic tool subjects, he was expected to and should acquire the knowledge and skills that were taught him. This point of view was entirely too restricted for it neglected to take into practical consideration the determining influences of moral motivations, the human emotions and the forces of the unconscious upon the nature of human conduct, including the learning of school subjects. These intervening forces generally exert important and determining influences in the learning process in between the stimulus-response terminals and, in most instances, have a great deal more to do, in determining the nature, direction, and intensity of the response, than the stimulus itself does. The learning process therefore is very complex and involves not only the functioning of the intellect but frequently the participation of many other forces within the individual as well. In order to demonstrate in a general way the complicated nature of learning a brief consideration of some of the conditions that are more commonly encountered by many children in learning how to read should be helpful. It should be pointed out in passing that the large number and variety of causes that give rise to most learning difficulties also expose the fallacy represented by an abiding trust in the simple stimulus-response principle—especially as applied to learning that involves the higher levels of the central nervous system.

Among the more important conditions that give rise to problems in learning how to read are the following:

1.1.2 *Emotional Disturbances.* Emotional disturbances, even in children with average or superior intellectual endowment, interfere very often with effective intellectual functioning. This is a condition, therefore, that often interferes with a child's efforts to learn to read satisfactorily. These handicapping emotional disturbances may be the result of any of several conditions, such as physical defects or deficiencies, wide variations in intellectual endowment, or to detrimental environmental situations. In any event, a very careful medico-psychological, environmental investigation and analysis is generally indicated in order to discover the real causes and to prescribe and help carry out the needed therapeutic program.

1.1.3 *Poor Fundamental Training.* Poor or inadequate preparation in the child's early training in reading is a condition that contributes to a deficient or otherwise defective foundation that often persists during the child's entire school career unless the proper assistance is provided to help him acquire the necessary fundamentals.

1.1.4 *Frequent Change of Schools.* Frequent change in schools, with the result that the child never had a consistent experience in the training he received in learning how to read, especially during his early school years when he was supposed to be learning the fundamentals, also constitutes fertile ground for the development of reading problems.

1.1.5 *Conditions due to Child's Class Placement.* A child, for example, with less than average intellectual ability who finds himself in a class with others who possess much higher intellectual endowment than he, but who, nevertheless is subjected to a reading program that is geared to their greater abilities, rather than to his greater needs, frequently becomes confused, overwhelmed and discouraged. Most

regrettable of all is the evident fact that he fails to learn to read.

1.1.6 *Unfavorable Social Influences.* Injurious social influences, especially home conditions, are frequently found to be at the bottom of a child's inability to read at a level that should be expected of him because of his native ability. For example, a home situation in which parents may have held up to a younger child the outstanding accomplishments of an older sibling with the result that the younger one feels incapable of attaining the heights of success achieved by his older brother or sister may and often does become an impediment that prevents the younger child from applying himself to learning to read and, therefore, he does not. Or, he may have wished unconsciously or consciously to punish his parents for their constant and prejudiced enthusiasm for the older sibling's success, and, at the same time, their anxiety and disappointment concerning his failure. In retaliation, therefore, he is trying to "get even" with them by failing in something that would give them great pleasure if he had succeeded. In the meantime the child also is not able to read.

1.1.7 *Sensory Defects.* Sensory defects, especially visual or auditory, due to which the child receives inaccurate or distorted sensations and, as a result, forms inaccurate, distorted and confusing perceptions, often constitute a major impediment to a child's efforts to learn how to read. However, these conditions fortunately are easily remedied by the proper medical treatment in the vast majority of instances. Unfortunately, however, in many of our schools sensory deficiencies and defects are allowed frequently to exist too long before they are detected due, in most instances, to the absence of regular medical examinations and of adequate diagnostic programs for discovering the causes of reading problems.

1.1.8 *Eye Imbalance.* In this condition the child, in attempting to learn to read, often produces reversals and mirror writing. Due to the particular nature of the physical condition that causes the ocular imbalance, if he is to be adequately helped, the child must receive very special training, which includes, first of all, a determination of the eye which has the greater potential for being the dominant eye and then, through the use of special techniques the assistance necessary so that it will acquire this function.

1.1.9 *Aphasia.* Aphasia is caused by organic pathology that may occur in one or more parts of the brain. When this condition is suspected the only intelligent and practical basis for instigating the proper program of training is, first of all, to establish accurately the general diagnosis and, then, determine the specific kind of aphasia.

The above descriptions of some of the many causes that give rise to problems in reading reveal also the great complexity of only one type of a learning situation, namely, reading, and it constitutes a good example of one aspect of education in which, if the child is to receive all the helps he needs, active participation of several types of specialists such as an educator, pediatrician, psychiatrist, psychologist, opthalmologist or endocrinologist, is necessary.

In each instance where a learning problem arises it is always absolutely essential to determine whether or not a physical condition is present, either as a causative or an aggravating factor. For this reason, especially, a physician and preferably a psychiatrist should be head of the clinico-pedagogical team that is responsible for dealing with such problems.

2.0.0 *Selection of Teachers.* As the object of modern education is the healthy development of the total personality of each child the teacher-child relationship becomes of paramount importance and not so much the I.Q. of the teacher, the graduate courses he has taken, or the degrees obtained. Regrettably, the latter criteria for selecting teachers still prevail in most school systems today. The personality of the teacher, and especially his attitude toward himself, other adults and particularly children, is the influence that will determine to a much greater extent the friendly nature of the classroom climate and the degree to which it fosters in children those most important feelings of being wanted,

liked and respected; an ability and a desire to like others, and a desire to be liked by them; a sense of personal and social security and, finally, an enthusiastic desire to learn and to work cooperatively and constructively with other children and the teacher. Only a morally conditioned, emotionally mature, healthy and happy teacher is able to foster, in the classroom, these attitudes and feelings, without which the child's healthy personality will be seriously and adversely affected. In addition, the child's ability not only to acquire but, what is of even greater importance, to use properly the knowledge and skills acquired through his school experiences, can be guided and strengthened best by this kind of emo tionally mature, morally oriented and physically healthy teacher.

3.0.0 *Educational Programs*

3.1.0 *In-Service Training of Teachers.* One potent factor that has been most responsible in retarding the successful implementation of modern education has been the lack of a clear understanding on the part of many educational leaders that the healthy development of the complete child, which constitutes the goal of modern education, is not just a modification of the older philosophy that was concerned primarily, if not exclusively with the teaching and learning of subject matter. Rather, it constitutes a radically new and entirely different educational philosophy. For this reason if teachers and supervisors are to be successful in helping each child develop healthfully, according to his particular abilities, deficiencies and defects, they must have a much more realistic understanding of what actually constitutes the total child and the influences that abet, retard or prevent healthy child growth, than was given to or required of them or their predecessors previously.

The following two courses are a minimum that should be made available to all teachers and they can be given satisfactorily by members of the staff of a child guidance clinic.

3.1.1 *Course in Child Growth and Development.* If the teacher and supervisor are to make their maximum contribution to the healthy development of the total personality of each child they must have the necessary knowledge and understanding of the many psychic and somatic forces, drives, needs and potentialities which are inherent in each individual and how they are fashioned, favorably and unfavorably, by the many and varied influences of the environment. The teacher must also understand that all behavior is purposeful and what these purposes are. This will help him, among other things, not to interpret the aggressive and hostile behavior of emotionally disturbed children as a personal affront but rather to recognize and deal with it as a symptomatic plea on their part for adult understanding and sympathetic help. In this connection the teacher must know also, for example, that anti-social or destructive behavior in any of its forms, although socially unacceptable or actually disapproved, serves some very important need of the individual. This is true even though, in most cases, the child's needs, under these circumstances, are pathological or otherwise unhealthy. Therefore, as a necessary foundation for discharging effectively his responsibilities toward all children the teacher and supervisor must possess a very practical understanding of what makes the so-called "normal" child "tick" and why other children are continuously and vehemently at odds with themselves and society.

3.1.2 *The Understanding of Children with Problems.* It happens too frequently that because teachers and others who deal with children have too little or no understanding of why the so-called "average" or "normal" child acts the way he does they do not understand, naturally, why the deviate is a deviate and how they can be of assistance to this child, who is troubled with and by himself and society. The neutral or indifferent, as well as the aggressive and positively injurious role that the adult may play under these conditions, is unfortunate especially in the case of those children who manifest their deprivations, neglect, unhappiness and other kinds of emotional maladjustment through aggressive or threatening behavior. In the vast

majority of instances it is only because these children have been denied in their own homes love and affection, the opportunity to contribute to the welfare of the family group and to experience feelings of success that one usually does when he accomplishes a difficult feat or when he develops a new skill or perfects one that he already possesses that they do not have feelings of being worthwhile, of dignity, self-respect and security. When this mental state is brought into being, as it is so frequently, unfortunately, these individuals find themselves literally at war with themselves and society. However, why some children develop aggressive and destructive behavior patterns, while others, who seem to have been subjected to practically the same denials or abuses in their homes and neighborhoods may develop into healthy individuals and praiseworthy citizens and, finally, while still others become withdrawn and asocial, although of very great practical importance, is too long and involved technically to be discussed here.

When the adult, who is responsible for children, lacks the necessary understanding of the underlying causes of behavior, particularly of a child's threatening or anti-social conduct, his tendency, almost invariably, is to interpret it as a personal affront and, consequently, to respond, all too frequently, in a punitive way and, in a manner that is at least as hostile as that of the child. As a result, due partly to his lack of knowledge of children and partly, because of his own personality inadequacy, the otherwise intelligent adult continues to hurt the child, who already has been seriously traumatized by society far beyond his capacity to endure. What could be more unintelligent and cruel, unrecognized and unintentional as it may be!

Teachers in regular school programs, as well as those in special education, therefore, must have a very practical understanding of the reasons underlying all behavior—healthy and unhealthy conduct—if they are to provide the maximum assistance to all children. This is especially important if they are not to fail to recognize the needs of the withdrawn type of child and equally important if they are not to react to the aggressive behavior of very sick children as if it were a personal insult and, thereby, make the pathetic lot of these unfortunate children even more unendurable.

Beyond being of maximum help to each child in his class through his own personal influence and professional service one of the most important functions that a teacher of a regular class can perform is to be able to "spot" those children who present evident problems and who, therefore, have special needs and, then, see to it that they are referred to the proper source so that they may receive the special helps they require.

This very practical understanding of the deviate and his needs is or should be, evidently, a required part of every teacher's professional equipment and not only required of those who are to go into special education. Only when he possesses these insights and is himself emotionally mature and well integrated will he be able to recognize at least most, if not all of the children in his class who have problems of an emotional, moral, physical, social, intellectual or learning nature; to personally be of assistance to some, and to obtain the necessary help for the others. In this way it will be possible for him to detect children's problems while they are still benign and, by so doing, help to prevent them from becoming more serious or even malignant, when the prognosis for treatment is much less hopeful.

4.0.0 *Curriculum Development and Classroom Instruction.* Most curricula in the past and in many instances today are so organized as only to provide the teacher with a reservoir of factual material in each of the subjects that are taught in our schools. These materials that constitute courses of study and curricula, and the suggested ways of using them most effectively are decidedly limited in their application because they are predicated almost exclusively, as has been stated previously, upon the single purpose of helping children acquire factual knowledge and, then, hope-

fully that they will understand at least some of its significance and its constructive use or application.

If, however, the real goal of education is the healthy development of the total personality of each child and, at the same time, to help him become a good citizen, then, the mere acquisition of factual knowledge becomes only an instrument or a means to this very important end, and not the end in itself. For example, every course of study, perhaps, without exception, can and should be taught so that the child acquires not only the particular factual knowledge and skills encompassed within the specific subject area, but it also should be integrated and interwoven into a synthesized mental fabric so that it will contribute to the child's healthy mental development. Literature and history particularly provide rich opportunities for this wider use of factual data.

This understanding and acceptance of what constitutes the goal and purpose of modern education, and the use of curricula materials to achieve these ends, require in many instances entirely new methods of teaching because of the need of realizing new and more important objectives. These technical changes in both educational philosophy and practices, although highly important and necessary, frequently produce profound emotional disturbances, not only in teachers but in parents, as well. The frustrations, anxieties and insecurities that are caused especially during the transitional period of giving up the old and "cherished" ideas and practices and the security they represent, in order to take on the new, which, to the parent and teacher is frequently strange, not clearly understood and often disbelieved, are found to occur almost as frequently among the younger as they are in the older parents and members of the professional staffs involved. The unhappiness, insecurities, anxieties, resistance and frustrations that are so frequently the price that is exacted by "change," in any worthwhile activity, constitute also part of the costs that must be paid, at times, for "change" that is an intimate part of progress. There is always the resulting obligation, therefore, to see to it that the new and, what are represented as increased favorable results that are obtained, in this instance on behalf of children, justify the price that is being exacted from those who must actually do the work of the activity.

In general, therefore, when both vocational and academic subjects are used primarily as vehicles to help each child understand not only the contents of the various subjects, but also the indispensability and effective use of spiritual and moral principles in motivating his personal life and social behavior, education will be more nearly discharging its full responsibility toward children and our free society than has been the case in the past, when total personal health and social competence were hoped for, but mostly as by-products, rather than being the direct results of a carefully and specifically planned program of education for living. The child whose education has enabled him to develop only or chiefly a more or less mechanically efficient mind-action, which is confined mostly, if not entirely to the level of memory has, as a consequence, a perceptive background that is, for the most part, made up of an undigested and unassimilated store of information. Such a child has developed a mentality that has been confined or reduced to the level of a man-made machine or to the functioning level of lower animals. This result is inescapable because the activity and influence of the human being's higher and spiritual nature has been almost completely dulled, if not entirely prevented from participating actively in the individual's entire personal and social life. For it is man's spiritual nature, and this only, that distinguishes him and sets him apart from and above all other animals.

The acceptance by education of the responsibility for inculcating in children an understanding of the importance and role of spiritual and moral values throughout their entire

lives is not to be interpreted as an action that usurps a responsibility and function that belongs primarily to the home and religion. The primary responsibility of parents and religious leaders in this area is not and cannot be questioned. However, if all the child's learning experiences are to be meaningful to him they cannot, in the process of learning them, be segregated into "air tight," non-communicating experiential compartments. For this reason educators, in order to make more and richer contributions to the completeness of children's mental growth, should be expected to take advantage of every experience the child has in school to supplement his home and religious instruction by helping him to appreciate the presence, role and effects of spiritual and moral values and the necessity of applying them in all his acts wherever they can or should be applied.

5.0.0 *Parent Education.* As parents are the first and only natural teachers of children they are the most important ones. Paradoxically, however, they are the only individuals who have any important responsibility for any aspect of the child's total education who are not required to have any special preparation whatever for their vital tasks. As a result very few parents possess the necessary specialized knowledge either of themselves or children which is essential if they are to bring to them the constructive helps and influences that they alone can provide.

It is also paradoxical that society requires evidence of a minimum competency for anyone who wishes to practice, for example, as a barber, beautician, plumber, architect, physician or lawyer—but for the highest of all natural professions—parenthood—no special preparation or demonstrable competency is required. As a consequence, very few opportunities are afforded even to those parents who recognize their parental obligations and limitations and who would welcome this much needed help and guidance.

The schools are one of the few community agencies that should assume some part of this responsibility for the total preparation of youth, for the very important obligations of marital life and parenthood.

Child psychiatrists and members of the staff of a child guidance service are in a position to make very valuable contributions in a program of parental education, because of their training and broad experience in helping with a wide variety of personal and social problems.

6.0.0 *Cooperation between the Home and the School.* Every child receives a very critical part of his education at home before he ever comes to school. This education, which the child receives in his home, is a most important part of his total education because it forms the foundation of his personality structure, socialization and habit training on which all subsequent educational programs, such as those provided by churches, synagogues and schools, must build. Although frequently the incomparable importance of the child's home training is either unrecognized or ignored, the fact is that if the schools are to make their maximum contribution to the healthy development of children through their special programs they must cooperate actively and continuously with parents in continuing, extending and enriching the child's expanding educational experiences. Too generally in the past and too frequently even today the schools plan and carry out their program as if they were the most important if not the only teachers of children.

As a result of a general lack of constructive cooperation between the home and the schools one of two erroneous conclusions, and sometimes both, are frequently drawn. One of these fallacies is to be found in the tendency to hold parents responsible for everything a child does that is not proper and at the same time to blame them accordingly. It is highly necessary, in this connection, that a clear distinction be made between the inalienable responsibility that parents have for the training of their children and, then, the inconsistency or injustice in blaming them and holding them fully accountable for failing to discharge all these responsibilities successfully. Most people, who are at all conversant with this

subject, agree as to the very important responsibilities that parents have in the total training of children. However, it is quite another matter to "blame" them for their failures when they are not able to be more successful than they are because the society in which they are living does not, for the most part, require individuals to prepare themselves for their great responsibilities of parenthood. Neither does our society, with few exceptions, provide the necessary opportunities for prospective or present parents to acquire this knowledge. There are many parents and prospective parents who would be very willing to obtain the technical information and understanding they know they need if they only knew where to secure it. In the absence of special training and special opportunities for such training most parents, regardless of the extent to which they fail to achieve their desired goals, make every effort within their limited ability to help their children to become morally healthy individuals and valuable members of their community.

The second and equally unfortunate, although quite different mistake is for educators to invite or urge all parents and other lay members of the community to participate in their deliberations in order that they may advise professionally trained and experienced teachers, for example, as to what the content of the courses of study should be and how they should be organized and taught. What a lack of professional self-respect and sense of professional security this all too common point of view and practice represent. Did anyone ever hear of engineers asking lay people for advice as to how they should plan and construct buildings or bridges just because most people worked, lived or did business in buildings and have ridden or walked over bridges? Or, that physicians have sought advice of their patients as to how to conduct clinics, treat diseases, prescribe drugs or perform operations just because most people have been sick or operated upon? If teaching is a profession it is equally ridiculous and unrealistic for parents and other lay individuals to be allowed, let alone to be asked and even urged to advise trained professional teachers as to how to conduct technical educational programs just because so many, some time during their lives, have attended school. In spite of the evident incongruity and unrealism that this practice represents it does exist.

Between these two unrealistic extremes is a midway position that is practical, necessary and defensible. For example, parents should be kept informed regularly by school authorities as to the educational objectives and instructional methods of the class and the school their child attends. Also, if parents observe in their child what they consider to be undesirable personal or educational outcomes the opportunity should be provided them to discuss their opinions in a frank and friendly conference with the proper school personnel. This two-way communication between the home and school, as well as with other members of the community, is one of the best ways of making effective any cooperative enterprise, but especially one as important as the education of children.

This realistic and practical relationship between the home and school also constitutes specific evidence that the complete education of the total child must be a cooperative enterprise in every respect and one, in which, for example, parents, religious leaders, school personnel, recreational and health workers, as well as others who, in any way, affect the lives of children, constitute themselves as an "educational team." Each member of this "team" has a particular contribution to make but, in making it, must do so in cooperation with all the other members. This cooperative approach to education, to be successful, however, must possess, among other values or characteristics, the recognition, on the part of each participant, of his own limitations as well as his possible contribution and, at the same time, a real respect for what each of the others has to offer. Each, therefore, must not in any way unnecessarily duplicate the work of or attempt to substitute his contribution for that of any other member.

It is most important that no lay person,

agency or representative of any community organization, regardless of how well intentioned he or the agency may be, should attempt to set up himself or itself as a super-educational authority and, by so doing, to usurp the prerogatives of the only duly constituted, professionally trained and competent individuals. Professional educators therefore—the only ones who are ultimately responsible to all parents and society for this aspect of the education of children—have a duty to disapprove and vehemently oppose any and all such destructive efforts no matter from what source they may appear.

7.0.0 *Cooperation between School and Other Community Agencies.* The number of community agencies that should cooperate with the schools in carrying out the full educational program for any given child varies considerably from child to child and from community to community. However, in many schools, especially in large cities, over the course of a term or a year, almost every religious, health, recreational, court, family and child agency would be called upon, with varying frequency and in different combinations, to help educators with individual children in accordance with their special needs.

These several agencies not only provide technical and helpful specialized services, but, in so doing, each is motivated by a very different underlying philosophy and employs very different and special techniques in providing their services than his colleagues in other professions. In most instances these technological differences are also very different from those that are employed in education. For this reason, before these several agencies and the schools can function harmoniously and effectively as co-partners in this highly important task of educating children, it is necessary for the representative of each agency to understand the professional orientation of each of the others. This orientation requires that each individual member must know exactly what each of the other agencies can contribute and, what is equally and sometimes more important, what are its limitations and, therefore, what it cannot contribute.

This kind of intimate working together for a common purpose, in this instance, the total health and welfare of children, is a relatively new and, frequently, very threatening experience to many professional workers. In the school setting this condition applies equally, at least, to the members of the clinic staff as it does to classroom teachers, supervisors and school administrators. The professional threat, anxiety, fear, hostility, personal and professional insecurity that such a partnership frequently creates can be prevented, or at least, greatly ameliorated when each professional worker respects the professional and personal status of all with whom he associates and recognizes the fundamental importance of getting to know all members of the team personally as individuals, i.e., what their professional contribution may and may not be and, then, seeing to it that they possess the same information and knowledge of him.

Only when these fundamental attitudes and knowledge are possessed and fostered by all who are expected to and should cooperate in the highly complex and technical enterprise of educating children will an effective begining be made of a program that will successfully encompass the total needs of all children.

This is particularly true if the child guidance service is an integral part of a school system, when due to its specialized knowledge and skills, especially those of the child psychiatrist, because of his basic and special medical training, as well as those of the other members of the staff, the service can and does make important contributions to modern education, which is concerned with aiding each child to realize his complete potentiality as a complex person, and by so doing, to prepare him successfully to assume his important role as a contributing and valuable citizen in our American Way of Life. This cooperative action and its goal—the total health of the complete child in which psychiatry, clinical psychology and psychiatric social work are making monumental contributions—represent a long term approach but it holds great hope ultimately for helping to bring about what is so badly needed today—world peace.

Expanding the Use of the Library's Historical Collections[1]

By W. B. McDANIEL, 2D.[2]

THE only excuse for draping myself over the lectern this evening issues, of course, out of the topic that the gentle, yet intrepid, chairman wished to have brought forward at this semi-centennial anniversary meeting of the Section on Medical History. It is one that the neophyte curator of the library's historical collections is naturally expected to—and does—wear constantly not on his shirtsleeve but on his shirtfront, turning on the neon lights whenever the shadow of a prospective audience comes into view. For one reason or another, you have been led to serve momentarily in that idle capacity, and, in the name of the topic, I thank you.

I had contemplated—and, indeed, drafted—an interminable, capital 'A' Address larded with wise saws (lifted from other contexts) and modern instances (out of my own portfolio). Having a latent quality of mercy in me, however, and a still more deeply hidden occasional wisdom gained from experience, I came to anticipate that, this late in the evening, with a business meeting yet to come, brevity in itself might prove to be the true Messiah. The neon lights are out. Now, the pale blue steam rising from the boiled beer.

It is proper to remind ourselves, first, that the library's historical collections are but one, if the noisiest, aspect of the College's historical treasures. Fortunately, the others are in the eminently capable hands of my admired colleague Mrs. Wade, who, as you know, has done a brilliant job of animating them. We plan—in the next world, if not in this—to forge additional links between the collections in the one domain and the other, so that one may more readily discern both the totality of the College's historical resources and related material dispersed among the various collections.

When this Section was started, in 1905, the library's historical collections were already notable and an obvious source of pride to the Fellows. There were, for instance, 123 incunabula and 366 manuscripts. The remarkable Samuel Lewis Library numbered well over 13,000 volumes; the Stockton Hough collection, nearly 3,000 volumes and 2,100 pamphlets; the Samuel D. Gross Library of the Philadelphia Academy of Surgery, over 5,000 volumes. In addition, there were, of course, countless rare volumes that had been acquired singly or in smaller groups. At that time, incidentally, the library staff was only about half way through the arduous and expensive task of transforming a catalogue of handwritten cards of various sizes into one of typewritten cards of uniform size, with classification and subject-headings revised to conform with those of the Index-catalogue.

Fifty years later, the library claims some 420 incunabula and 796 manuscripts. There are a few and invaluable other special historical collections—the William N. Bradley collection of photographs of art representations of Philadelphia physicians; the Carson and Sturgis collections of illustrative material (portraits and other medical subjects); the Gilbert collection of manuscript letters; the Samuel D. Gross Library of the Philadelphia Academy of Surgery and the George B. Wood library; the Flick collection of ephemeral publications on tuberculosis; the autographs, and the theses. But the largest and most glorious of the rare book collections—the Samuel Lewis and the Stockton Hough—were early merged in the

[1] Read before the Section on Medical History, College of Physicians of Philadelphia, 22 November 1955.

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general collection, and to this day subsequent acquisitions of rare books have met the same degrading fate. The result is that a publication of 1501 (the first post-incunabula year) may be found rubbing shoulders, on the one side, with a common and historically insignificant publication of, say, 1889; on the other, with an only temporarily useful product of 1925 —or perhaps 1955. Admirable and even touching as this may be in its mute allegiance to the concept that past and present and future are indivisible, it is, from a purely material point of view, I am sure you will agree, reckless almost beyond belief; from the standpoint of adequate administration and study of this material, it obviously offers very severe handicaps. But I shall return to this irrational situation in 5 or 6 minutes.

The use of any collection is in direct proportion, let us say, to three controlling factors —and they are not faith, hope, and charity. They are 1) both passive and active dramatization of the existence of the collection; 2) the organization and processing of it; and 3) the servicing of it. If you will bear with me, I will set sail under these three heads presently; but first, since expanding use implies some current degree of use, I thought it might be of interest to indicate some of the ways in which the historical collections have recently tried to pay for their board and keep. To do this, I shall dip into the Curator's current correspondence portfolio for a moment.

Our copies of the Edinburgh Pharmacopoeia, 1735, and of Béguin's *Tyrocinium chymicum*, 1669, for instance, supplied answers to bibliographical questions from distant correspondents. The covers, miraculously still in place, of our unbound copy of the first edition of Willan's *Description and treatment of cutaneous diseases* (1797–1808) confirmed the answer to a bibliographical problem proposed by a Cambridge University investigator; and, via photostats, provided him with other information he regarded as valuable. The manuscript collection contributed an item to a projected bibliography of early American meteorological observations in manuscript. The Bradley, Sturgis, and Gilbert collections were drawn upon; so, too, the autograph collection. The collection of early medical school catalogues turned up valuable evidence; the early theses of our first medical school were searched for dedications to Thomas Bond. A search through several of Rush's publications uncovered the correct wording of a pronouncement only dimly remembered by a distinguished physician in another city. Add to these selected examples of long distance use the service rendered over the telephone and on personal visits—both in the reading room and in the curator's office—and you may correctly reach the conclusion that the historical collections not day by day but hour by hour amply justify the emphasis we are placing on creating the conditions which will ensure still greater use of them. Now, back to our heads.

The existence of an important historical collection is customarily dramatized on a continuous basis by a separately housed and staffed rare book and history department, to which visitors, telephone callers, and mail emitting the faintest historical odor are promptly and joyfully referred. I give you, as eminent examples, the New York Academy of Medicine, the Armed Forces Medical Library, the Yale Medical Library, the Cleveland Medical Library Association, the Lane Medical Library, etc., etc. This is the mark of pride of possession matured into responsible stewardship. It is a mark that we have just now taken the first steps to obtain. Before too long there will be in operation, at the west end of the periodicals room, the newly designated Packard-Krumbhaar Medical History Alcove. It is not the rare book and history room that we might have wished for, but it is the best compromise that our nearly half-a-century old palazzo, and other controlling factors, could be nudged into providing. Useful by means of its concentration of historical reference works, its relative greater quiet and comfort, it will serve as a continuous passive dramatization of the existence of an important historical collection.

In the active dramatization, there are parts

for all of us, if we will play them. I am not counseling that we follow the ultimately wearying (to the auditor or reader) practice of some other libraries and inject the name of the College and the Packard-Krumbhaar Alcove into our every public and private pronouncement, but a frequent use of the words among ourselves and a judicious use of them on the public highways would certainly tend to remind all with a medico-historical itch that there was a fair prospect of satisfactorily assuaging it at this address. For our part, we plan to resume, in January, the monthly historical *Fugitive Leaves* that were issued for several years in the 'thirties. These will go to every Fellow of the College, of course, and to leading medical libraries in this country and abroad. They will welcome brief contributions from members of the Section, from the staff, or from others, that are based on the library's historical collections. As in the past, and particularly with the broadened base of contributors, the little *Leaves* may prove a more potent press agent than their informality of format might suggest. Too, the dissemination of such auxiliary tools as the nearly completed Index to the William G. Leaman, Jr., Collection of Lantern Slides should help to dramatize actively the existence of various of the historical resources, and thus lead to greater use of them.

Now, the greatest of historical collections is almost useless unless it is organized and processed for *historical* use. Because of the earlier-referred-to practice of organizing and processing our older bibliographical citizens on precisely the same terms as those applied to the neonates, only a fraction of their potential usefulness has been squeezed out of them. The 7th floor of the new stack wing has been assigned to house the rare books. Upon the opening of the new stacks it will be necessary for the curator to examine superficially every classed book in the present stacks to recover those of the 16th, 17th, 18th, and some of those of the 19th centuries for removal to the first home of their own that they have ever had. In the end, these valuable old citizens will be safely and comfortably housed, and, hardly less important, they will be in a situation favorable to the studies that will enhance their own usefulness and allow us for the first time to augment the historical family in accordance with the civilized principles of planned parenthood.

We have now dealt, in I fear an unforgivably arbitrary fashion, with two of the factors controlling the use of a collection—the dramatizing of its existence; and its organization. In equally arbitrary fashion, we must now consider the two other equally vital factors—processing and servicing; actually, two ugly words denoting a single organism with two heads.

The premise here, which I shall lay down as though it were incontrovertible, is that the cataloguing of material for historical research goes into some avenues of learning not invaded in the cataloguing of current material; that the cataloguer trained solely or largely for the latter, a highly developed field in itself, should not be, and customarily is not (in institutions with large holdings of both current and historical materials), expected to have the time or the knowledge or the inclination to toil in both vineyards. And yet that is what has been demanded of our cataloguing staff generation after generation. With the best will in the world (and never has the good will, as well as skill, been more pronounced than at present), they could not serve two masters without one of them falling heir to the short end of the wishbone. It has been estimated that there are some 30,000 historical books in our collections that deserve to be re-studied for emendation of early cataloguing and for the additional contributions to historical research that many of them are unquestionably capable of making. Further, our incomparable librarian recently reported to the Library Committee that there are 851 historical items received in the last few years that cannot make any contribution at all at the present time for the simple reason that there has not been time to catalogue them. As Mr. Morse expressed it, "This material requires more study and more

detailed cataloguing than its modern brothers."

Perhaps nothing that we may do will have more influence in extending the use of the library's historical collections than the finding of a successful solution to this problem of reprocessing and subsequent specialized processing and servicing. If this work of rehabilitation, reconstruction, reeducation (to borrow one of our overripe subject headings) is to be done, obviously it can not be accomplished entirely by a curator in a one hoss shay. We are challenged to accept the need, and then to provide, for, in addition to a curator, a cataloguer-bibliographer trained in the ways of historical scholarship, and a handmaiden capable of assisting her and of translating the results of the latter's and the curator's lucubrations into the customary means of communication between reader and material. I say nothing of the fact that the library is open more hours than anyone but our indefatigable librarian is likely to accept as a routine working day-week-month. We have some hope that funds may be obtained outside the College for the start of this long overdue project of rehabilitation etc., which will take two or three years merely to recover the ground lost. Even if, happily, this should come about, in the end, there will still remain the need to find ways of maintaining ourselves permanently in the style to which we have then at long last, and quite properly, become accustomed. The subject of a recent obituary in the *Lancet* is said to have remarked, when there was discussion of a forward step that everyone agreed should be taken but for which no funds seemed available: "But that's merely an economic problem. Surely there could be no difficulty in solving that." An airy attitude to take, you may say; but is it not really the only courageous and workable one open to the crusader?

Finally, I have been asked to indicate ways in which the members of this Section might help in our efforts to extend the use of the historical collections. It is a heartwarming request of which obviously some advantage has already been taken, explicitly and implicitly. The Section and the historical collections are, of course, merely two manifestations of a cultural interest that has for many years characterized distinguished groups of Fellows of the College. But there has hitherto been no formal liaison between the two manifestations. Might this evening indeed be one of those moments when the young blood of 50 resolves to keep his weather eye in the future a little more closely on the welfare of the elder brother whose hand has ever been outstretched to him through the years?

It has already been suggested that, self-constituted as a publicity committee of one, the Fellows of the Section might judiciously and deliberately raise up the existence of the historical collections and the Packard-Krumbhaar Alcove whenever a neat occasion presents itself; that more frequent publications, by members of the Section, of studies based on the collections would tend subtly to encourage other use of them. It would seem to the curator highly appropriate, and a most benevolent development, if the Section, on its 50th anniversary, should find itself inspired to establish a Friends of the Historical Department group, leaning for precedent not only on similar institutions but on our own Friends of the Library group that the second World War, and the deaths of several dynamic members, brought to an untimely end. Such a group could be most influential at all times, but especially in the years immediately ahead, when there is a vital need to increase the funds for the purchase of rare books and to dramatize the need for further funds to enable the historical department of the library to function in accord with its magnificent resources. We in the library are acutely conscious of these needs and dedicated to do all in our power to fulfill them; but fulfillment of them rests ultimately not in our hands, of course, but in those of the Fellows of the College.

The sense of history which is in the nature of a personal religion to which we try enthusiastically to convert others may be a personally satisfying possession and have export value as well; but that is not to say that it is necessarily

Revelation in the widest terms. It may be that an equal conversional potential inheres in the sense of history which, regardless of the presence or absence of opportunity for personal identification, leads us, say, to forward the work of the temples of history in which priests and disciples find the illumination they seek; add to that already available; and issue forth to convert, armed no more with passion than with the humility that comes from wide reading and deep thinking. There are sterile, and there are fruitful, ways of serving any good cause; our choice of them is a measure, one supposes, of our good sense and of our sincerity—and often, as time goes on, of our capacity for growth.

When I humbly venture to suggest that we would warmly welcome, on a systematic and continuous basis, the fraternal interest and support of the Section in our efforts to increase the use of the historical collections, there is in my mind, not only a natural curatorial regard for the interests of the infant historical department, but also a fond concern for the welfare of the Section itself that has extended over nearly a half of its lifetime. I do not see why two such natural partners—granted that secondary factors are intelligently treated as such—should not shake hands and put out a shingle in common.

And now the pale blue steam has evaporated for the time being.

Memoir of John Eiman (1886–1954)*

By CALVIN M. SMYTH, M.D.

JOHN EIMAN was born in a suburb of the city of Riga, in Latvia. He received his early education in the public schools and in 1907 immigrated to the United States. According to his own statements, after clearing the immigration authorities at Ellis Island, he came to Philadelphia by train arriving at the old Huntingdon Street station on the Reading wearing a tag bearing the name and address of a fellow countryman who was expecting him "sometime." It was necessary that he be so tagged, for he spoke not one word of English. Because he was fluent in German, and because his friends lived in the general neighborhood, he sought employment at the old German (now the Lankenau) Hospital. He was assigned to the laboratory as a diener (or as he always said—a scrub). Because of a great natural ability and willingness to work he soon became familiar with, and was able to carry out, most of the procedures then done in hospital laboratories.

He attracted the attention of the late John B. Deaver who encouraged him and made it possible for him to complete his high school and premedical college work by attending classes at Temple University at night. He won a scholarship at the University of Pennsylvania School of Medicine where he began his medical education in the fall of 1914, just seven years after coming to this country. During his first two years in medical school he lived at the Methodist Hospital where he worked at night and weekends in the laboratory. At this time he became very proficient in the performance of the Wasserman test and a great many syphilologists sent all such work to him. In his third year at the University Dr. Eiman had earned enough so that for the first time in many years he could afford to be just a student.

He often referred to this year as one of the happiest of his life. In 1917, due to a great shortage of doctors on account of the war, he moved into the Presbyterian Hospital where he did the major part of their laboratory work. Upon graduation in 1918 he remained at Presbyterian as an intern and upon completion of a year of rotating internship was appointed Pathologist to the hospital, a position which he filled until he resigned to accept the directorship of the laboratories at Abington Memorial Hospital, which position he retained up to the time of his death. He served as Assistant Professor of Pathology in both the Undergraduate and Graduate Schools of the University of Pennsylvania.

In 1920 he married Jeanette Watkins of Odessa, Delaware, by whom he had two sons: John Watkins, and William J. Eiman. The former, also a physician, succeeded to his father's position at Abington.

John Eiman was a colorful figure. He had a tremendous capacity for work and for play, and it took a sturdy soul indeed to keep up with him when he played. He had many interests outside of medicine, the greatest of which was sailing. He organized the Comet Class in 1933 and at the time of his death was its Commodore. Second only to his interest in sailing was his interest in Mayan archaeology. He made many trips to Mexico in pursuit of his researches along these lines and had one of the most remarkable photographic collections pertaining to this subject. It was while on one of these trips, accompanied by his wife, that he died suddenly in Guadalajara, Mexico, apparently from rupture of an abdominal aneurysm.

John Eiman's life story is one possible only in the United States of America. He always referred to it as "This God's blessed land."

* Prepared and published at the request of the Council of the College of Physicians of Philadelphia.

Memoir of John Elias Hume (1875–1954)*

By MYER SOLIS-COHEN, M.D.

John Elias Hume, son of Robert and Ellen (Caskaden) Hume, was born in Philadelphia November 16, 1875.

He received his education in the William Penn Charter School, in Haverford College and in the Medical Department of the University of Pennsylvania, from which he was graduated in 1900. A few weeks later he became a resident at the Philadelphia Hospital, having made first place in a competitive examination. Upon completing his residency he opened an office at his home, 900 South 49th Street, where he practiced general medicine.

He worked in the dispensaries of the Howard Hospital, the Northern Dispensary and the Polyclinic Hospital, later being appointed to the Visiting Staff of the Howard Hospital.

In his student days he was a member of the Phi Alpha Sigma, the Sigma Psi and the Triangle fraternities. After graduation he joined the Philadelphia Pathological, Pediatric and County Medical Societies and the American Medical Association. January 3, 1923 he was elected a Fellow of the College of Physicians of Philadelphia. He also was a member of the Philadelphia Medical and Motor Clubs and the Belmont and Delaware County Field Clubs.

In World War I he entered the U. S. Army as First Lieutenant and in five months was promoted to Captain and eight months later to Major. He served with the 301st Engineers at Camp Devens and with the 303rd Field Artillery as Regimental Surgeon in France.

Subsequently he specialized in internal medicine and had an office in the Central Medical Building. He was made an Instructor in Medicine in the Graduate School of Medicine of the University of Pennsylvania.

Owing to ill health Dr. Hume retired from active practice a number of years ago and gave up his downtown office but continued to see patients at his home.

Dr. Hume was modest and unassuming, rather diffident with strangers and somewhat difficult to meet, but well liked by and popular with his friends.

While at Ocean City in the summer of 1954 Dr. Hume was about to take a shower and by mistake turned on the hot water and was severely scalded on his arms and back. He was taken to the Shore Memorial Hospital at Somers Point, where he died four days later on September 6.

Dr. Hume's interest in education and his love for and loyalty to his *almae matres* are exemplified by his will in which he left upwards of $142,000.00 to be distributed in equal parts to Haverford College, the University of Pennsylvania and the College of Physicians of Philadelphia.

His own estimate of his life was epitomized in the information he supplied for the Fifty Years Record of his medical class, of which he was Vice-President:

"I am still in the Game, no runs, no hits, no errors."

* Prepared and published at the request of the Council of the College of Physicians of Philadelphia.

Memoir of Hunter W. Scarlett (1885–1954)*

By BURTON CHANCE, M.D.

Dr. Hunter W. Scarlett, elected a Fellow of the College in 1920, died December 23, 1954.

Dr. Scarlett was born in Erie, Pa., October 16, 1885. After his secondary school education, he came to the University of Pennsylvania, graduated in Arts in 1907, and in 1911 received his M.D.

During his college days he was very active in sports, especially football, having the unusual record of never having been taken out of a game because of injury.

After completing his medical course, he served at the Pennsylvania Hospital. Becoming interested in bacteriology, he decided to go to France to enter Morax's laboratory. While in Paris, he was appointed chief resident at the American Hospital, recently established there. By this time he began to be interested in ophthalmology. When World War I was declared, he became a co-founder of the American Ambulance and was immediately appointed Ophthalmologist to the American Ambulance which position he held until invalided home in 1916.

On regaining his health, in 1918, he volunteered for the Medical Service of the United States Army and was assigned to Hospital No. 11 at Cape May, N. J., where he served until July 12, 1919.

Entering on the practice of ophthalmology, he was appointed assistant attending ophthalmologist at the Pennsylvania Hospital, and held the same position at the Bryn Mawr Hospital, contributing a number of papers to the French and American journals.

He continued his deep interest in ophthalmology until his health failed and he retired from active practice in 1939, but continued as consulting ophthalmologist to Bryn Mawr Hospital until his death.

A memorial service was held at the Church of the Redeemer, Bryn Mawr, Pa.

* Prepared and published at the request of the Council of the College of Physicians of Philadelphia.

TRANSACTIONS & STUDIES
of the
College of Physicians of Philadelphia

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(Fourth Series)

Number 4
(April 1956)

President's Address

By LEWIS C. SCHEFFEY

NEARLY half a century ago—46 years, to be exact,—the building we occupy was dedicated formally on the 10th of November, 1909. Weir Mitchell and his friend Carnegie, to mention but two of the galaxy present that day, must have been content as they realized what vision and the substantial aid of loyal Fellows of the College and their civic minded friends had accomplished. For it was likewise 46 years earlier, a few months before the scorching July days of Gettysburg, in 1863, that the College moved from one of its earlier temporary homes to the new building of that day at Thirteenth and Locust Streets. A building fund, established as far back as 1849, made possible the gracious Hall that was to suffice until the ivy-clad walls could no longer accommodate a vigorously growing membership and its increasing activities.

And now that second cycle of 46 years is rapidly coming to a close. One year ago, on January 5, 1955, your retiring President, Dr. Kern, told you his thrilling story of still another building campaign to enlarge this building and increase its facilities; of its final days of success, when a grand total of $640,724 was secured from three sources—"Fellows, Friends, and Foundations"—and almost simultaneously with the midnight chimes welcoming the New Year! Dr. Kern's address was vitally important. It was heard by too few. Informative and factual, I felt, as incoming President, that its substance should be made known to the entire Fellowship at once, and long before it could be read in the April "*Transactions*". With Dr. Kern's stirring campaign bulletins in mind, I prepared a mimeographed letter that went to all the Fellows on January 26, giving the basic facts about the success achieved, and about his appeal for continued gifts and contributions from as many sources as possible to sustain and increase income from the "Endowment and Development Fund", so necessary for proper maintenance of the College. And thus the policy of monthly "Newsletters" to the Fellowship evolved.

As President I am directed by the "Charter, Ordinances and By-laws of the College" as enacted into a law at Philadelphia on March 6, 1789, duly signed by Richard Peters, Speaker of the General Assembly of the Freemen of the Commonwealth of Pennsylvania, and attested by its clerk, Peter Zachary Floyd, to present "an Annual Address at the Regular Business Meeting in January." Since no specific agenda is designated, there is latitude for discretion on my part. The past has been an exciting year for us, and I have kept you abreast of the progress of the building and rehabilitation program, have commented upon the scientific and other lectures, and have kept you aware of numerous other activities that I felt were of sufficient interest, through the medium of these "News-

letters", of which ten were issued during the past calendar year. Automatically they are becoming part of the archives of the College. For these reasons there seems to be no need of repetition of the many items touched upon in this manner. I have also observed that previous addresses not infrequently duplicated items or statements from the reports of the various departments and areas of the College that were eventually published in the same issue of the "*Transactions*" that carried the Presidential address.

Hence, I feel free to depart from custom in some respects and emphasize those things of the moment that are of primary importance and concern to the College, its present and future, and to point out the responsibilities that devolve thereby upon each one of us as Fellows of the College. Some informative data are now in order.

STATUS OF THE FELLOWSHIP

As of December 31, 1955 the entire Fellowship of the College numbered 1090 distributed in the following categories: 973 Resident, 106 Non-Resident, 2 Associate, 4 American Honorary, 3 Foreign Honorary, 2 Honorary Associates. This represents a net gain of 43.

DEATHS

Sixteen Resident Fellows died during 1955, and I ask that you stand in reverence as I read their names.

Resident Fellows

Albert E. Bothe
Henry P. Brown, Jr.
Howard C. Carpenter
Sumner H. Cross
David N. Husik
H. Wesley Jack
Edward J. Moore
Hubley R. Owen
Thomas A. Shallow
William B. Swartley
William S. Wadsworth
John K. Walker
Warren Walker
James W. Wister
Joseph C. Yaskin

ADMINISTRATIVE STAFF OF THE COLLEGE

When I mention the administrative staff it is to speak primarily of the spirit in which the maintenance of the building and the activities of the various service areas have been carried on during the physical disturbance incidental to the building and rehabilitation work schedule that began in March 1955. I shall only repeat what I have already said in our periodic reports to the Fellowship—that Mr. Morse, Miss Lang, Mr. Allen, Dr. McDaniel, Mrs. Wade and Mr. Beatty with their respective associates, exhibited and continue to exhibit a loyalty and devotion to your College that cannot be measured in dollars and cents—and this in the face of the physical indisposition of several of them. I know that I speak for all of you when I convey to all persons concerned, (and each one of whose names I would mention individually if time and space permitted), our sincere gratitude for their valiant service. In this connection I am also happy to acknowledge with thanks the ever ready cooperation and meticulous consideration rendered us by Mr. Allen Cornell for the builders, and Mr. Robert McGoodwin, the architect; I know that your Building Committee joins with me in this thought. As to the progress of the project, it seems likely that the reasonably well-maintained schedule of operation will be completed by early spring—perhaps in March. This is the most recent information given the Building Committee.

OFFICERS, COMMITTEES AND SECTIONS

I thankfully recognize the cooperative effort and helpful support of my colleagues who comprise the Council of the College so needed in determining our administrative policies, and I extend the same appreciation to those Fellows who have served on the elective and appointive standing committees, the various prize committees and trustees, and to the personnel of the Sections. We are indebted to Mr. Eric A. McCouch, Honorary Legal Counsel, for helpful decisions during the past year.

The various annual reports for 1955, including that of the Treasurer, will be published in

a forthcoming issue of the "*Transactions*" and should prove most informative, if you will but take time to read them.

It is of special interest at this time to state that the portraits of two past presidents were acquired recently—those of Alfred Stengel and O. H. Perry Pepper. The College is indeed grateful for these acquisitions, and sincerely thanks the donors who made them possible.

The recent survey and recommendations concerning the organization and progress of the Philadelphia County Medical Society offer certain avenues of mutual approach between the Society and the College that suggest opportunities for exploration.

FINANCES

I now turn to the financial worries of the College. They are not new but have become more acute and our concern is grave. Twenty-four years ago (1932) the then President, Dr. Francis R. Packard, began his annual address by stating—and I quote—"I am sorry to say that there has been no improvement in the financial status of the College during the past year". We are not in that frame of mind exactly, for the past year has seen accumulated and generously contributed funds going into brick and steel and concrete to provide the sorely-needed stack building, and to refurbish many areas of the present building. Likewise new and improved heating, ventilating, elevator, illuminating, electrical equipment and a duct system for future air conditioning have been provided; library, museum, and other working areas have been revamped before our eyes. About $480,000 of our accumulated building fund has been expended to date, but we will be able to settle in full when the balance of the cost comes due a few months hence.

Nevertheless, as I have pointed out to you in recent communications, increased maintenance goes hand in hand with increased facilities and the added services that naturally follow. The budget that you have just voted to approve is a budget in the red—and for the first time in the history of the College, but I am not dismayed in telling you this. Why not, you ask? Because the Council unanimously agreed, after hearing the budget recommendations of the various officers and committees that increased salaries were needed and justifiable on two counts—first, for services well rendered; and second, to keep trained personnel in our own institution instead of simply becoming a training center for other libraries.

Then again I am not dismayed for another reason. I believe that when you realize why our budget is a deficit one, you will meet this challenge as you met the one a year ago when you fulfilled the stipulations of the Foundations in order to justify their generosity to us. To recapitulate, our budget situation, as summed up, is as follows for the fiscal year, Nov. 11, 1955 to Nov. 10, 1956, inclusive:

Secretary	$5,703.20
Treasurer	5,334.10
Publication Committee	4,185.00
Committee on College Collections	3,140.00
Hall Committee	24,535.88
Library Committee	68,020.00
Pension Fund	1,964.08
	$112,882.26
Anticipated Operating Income 1955–56	
Income Current Operating Account	$69,160.01
Balance on hand 11–10–55	2,715.01
	71,875.02
Income Publication Committee	891.51
Income Committee on College Collections from the Abbe Fund	120.00
Operating Income Library $34,230.56	
Balance on hand 11–10–55 1,091.19	35,321.75
Total anticipated operating income	$108,208.28
Total anticipated operating expenses	112,882.26
Anticipated deficit 1955–56	$4,673.98

When appealing to the Fellows during the past few months for year-end contributions to the Endowment and Development Fund, someone remarked to me that we would have to receive gifts in the amount of $100,000 in order to insure sufficient income to overcome the deficit in this year's budget—not a very encouraging thought! Nevertheless during November and December, contributions to this fund amounted to $2098.76 making a grand

total for the year of $7476.01, including contributions to the J. Harold Austin Fund. Also, I repeat with deep appreciation on behalf of the College the second grant during 1955 from the Donner Foundation—$10,000 toward the cost of renovating and decorating Mitchell Hall, in which project we gratefully acknowledge the willing and artistic aid of Mrs. Alice Rhyne.

A year ago Dr. Kern stated that an Endowment and Development Fund of $400,000 was an essential goal for the near future. In attempting to attain this figure I realize full well that we Fellows cannot achieve it with cash from our own pockets. Neither should we always be in a hurry to rush to the Foundations repeatedly for help, but should utilize avenues of our own to interest local sources to contribute to this renowned Philadelphia institution as was done so successfully in the Building Fund campaign a year ago.

With increased facilities go increased responsibilities. The majority of the Fellowship have responded generously and as their means and influence have allowed. Remember other channels that are available for increasing our endowment: The J. H. Austin Memorial Fund; memorial gifts for the "Book of Remembrance"; testamentary legacies. To those Fellows who have not yet seen fit to contribute to the College beyond the payment of their dues, I shall appeal again and again. There may be some among us who think that the College has ample funds for maintenance in its portfolio. I state the truth when I say that, with the exception of some $70,000 in principal assets, the income from an invested principal of approximately $850,000.00 is specifically restricted by the terms of the legacies for earmarked operating expenses only! This fact explains why the future needs of College maintenance depend upon progressively increasing the Endowment and Development Fund. It is upon this note that I bring this address to a close, but I would indeed be remiss if I did not at this time thank the Fellowship for their confidence in re-electing me for a second term. I shall do all in my power to justify that trust.

REPORT OF THE TREASURER FOR THE YEAR ENDED NOVEMBER 19, 1955

Assets

Cash in banks and on hand		
General fund	$5,226.44	
Trust fund balances of income (restricted)	20,667.26	$25,893.70
Assets held in trust funds		
Mortgages	53,838.87	
Bonds	295,385.64	
Preferred stocks	310,492.49	
Common stocks	401,275.15	
Principal cash for investment	96,322.94	1,157,315.09
Property		
Land—15–25 South Twenty-Second Street	95,000.00	
Building	782,500.00	
Construction in progress	438,766.78	
Furniture and fixtures	1.00	
	1,316,267.78	
Deposits on perpetual fire insurance policies	9,521.28	1,325,789.06
Total		$2,508,997.85

Funds

Unexpended income—general funds			
Library general account		$305.10	
Life membership account—uninvested portion		20.12	
Reserve for contingencies—uninvested portion		190.02	
Operating fund balances			
Current operating account	$2,715.01		
President's room	525.00		
Publication committee	227.65		
Friends of library	20.00		
Entertainment committee	371.11		
Books	24.23		
Rare books account	152.96		
Campaign expense account	750.95		
Portrait account	126.47		
	4,913.38		
Less: Overexpended balance Harvey's "De Motu Cordis" Facsimile 1628 edition	202.18	4,711.20	$5,226.44
Unexpended income—trust funds			
Discretionary common trust fund		18,135.02	
Legal common trust fund		154.41	
Trust funds not pooled		2,377.83	20,667.26
Trust funds principal (book values)			
Discretionary common trust fund		813,680.28	
Legal common trust fund		24,097.94	
Trust funds not pooled		16,962.58	
Special account re: purchase money mortgage secured by Northeast Corner 13th and Locust Streets property		51,750.00	
Maintenance and reserve fund		20,486.49	
Fellows building fund		145,985.40	
General contributors' development fund	517,741.93		
Less: Amounts expended re: building additions and renovation (construction in progress)	438,766.78	78,975.15	
J. Harold Austin memorial fund		1,699.21	
Building fund (voluntary contributions)		1,080.00	
Endowment fund (voluntary subscriptions)		2,598.04	1,157,315.09
Plant fund (including amounts expended re: building additions and renovation above)			1,325,789.06
Total			$2,508,997.85

Statement of Income and Expenses

Income			
On investments net of agent's fees			
Trust funds		$43,734.76	
Income funds, principal of which is not administered by the College of Physicians of Philadelphia		808.19	
Mortgage		2,392.03	$46,934.98

Contributions		
Fellows dues	45,500.00	
Entrance contributions	3,250.00	
Use of halls and projector	3,446.50	
Miscellaneous contributions	1,449.32	53,645.82
Library		13,494.71
Miscellaneous		3,353.97
Total income		117,429.48
Expenses		
Operating expenses		
Hall committee	19,889.46	
Office of the Secretary	5,434.46	
Office of the Treasurer	5,339.38	
Pensions	3,349.96	
Campaign expenses	1,554.40	
Publication committee	3,736.31	
College collections committee	2,950.37	
Books	1,563.78	
Entertainment committee	230.48	
Portraits	1,097.53	
Transfer to maintenance and reserve fund	1,000.00	
Entrance Contributions transferred to principal of Reserve Fund	3,250.00	49,396.13
Library		
Salaries and payroll taxes	38,992.95	
Books, journals, supplies, etc.	21,993.50	60,986.45
Restricted trust funds		
Discretionary common trust fund	5,502.62	
Legal common trust fund	1,004.92	
Trust funds not pooled	363.15	6,870.69
Total expenses		117,253.27
Income in excess of expenses		$176.21

STATEMENT OF INCOME AND EXPENSES

NOTES: Receipts of special purpose funds from contributions, transfers of funds and security investments not included in the above schedule were as follows during the fiscal year ended November 10, 1955:

Fund	Amount
Maintenance and reserve fund	$2,860.44
Fellows building fund	42,738.24
General contributors' development fund	414,243.24
J. Harold Austin memorial fund	183.00
Building fund (voluntary contributions)	1,080.00
Endowment fund (voluntary subscriptions)	2,598.04

JACOB H. VASTINE, 2nd
Treasurer

Annual Report of the Library*

ADMINISTRATIVE

Renovation and Expansion

Last year's debt of gratitude to the planners and fund raisers has been followed by appreciation for another labor of patience and concern on the part of the Building Committee, the Builder, and the Architect. During the year there were fifteen official meetings of the Building Committee: Drs. J. E. Rhoads (chairman), R. A. Kern, T. G. Miller, and L. C. Scheffey, R. R. McGoodwin, the architect, and the Librarian. During most of these sessions the committee was joined by Mr. Allen D. Cornell, the builder, and Mr. John W. Keyes, the associate architect. The success of the actual construction must be largely attributed to the willingness of this group to make a continuing study of the myriad details involved in a major remodelling program. Unforeseen developments were handled expeditiously and the library's voice was always given a sympathetic hearing.

"Business as Usual"

The day to day struggle to keep operations nearly normal was the prevailing concern of the library staff during the year. A facade of "business as usual" was attempted but the renovation and expansion work exacted a heavy toll in dirt, noise, and every conceivable disruption. Because it is expected that the opportunity may present itself for a more detailed narrative of the changes themselves and their implications for the library's future, the present report will restrict itself to the briefest outline.

On stage, readers were most aware of the price of progress during the summer and early fall when alterations required the closing of, first, the Reading Room, then the Periodicals Room, and finally, the scaffolding of the entire upper lobby. All library services were dispensed through the Periodicals Room during the period May 10th to July 6th. Periodicals Room functions were then transferred to the newly redecorated, relighted, and reventilated Reading Room from July 6th to the beginning of October.

Behind the scenes, confusion also reached its climax during the summer months when the work rooms were completely abandoned to the demolition and reconstruction crews. The Preparations Division personnel and the Paging Staff fled to makeshift quarters in the Librarian's Office and the Reading Room. The Librarian was so busy watching the fun that he didn't need an office anyway. The reward of this trial was the conversion of an area formerly containing two small work rooms, three wash rooms, two coat closets, and a supply closet, into one cheerful workroom.

Hardest hit was the book stack area which was in critical condition from the outset. The removal of about 20,000 volumes to temporary shelving in the upper lobby and study rooms was begun in March. Horizontal ducts on both sides of every floor of stacks, vertical air shafts, and elevator hatches required the clearing of thousands of feet of shelving, compounding an already complex location problem. Power hammers, cutting holes in the very walls, raised plaster and brick dust which liberally distributed itself throughout the building despite temporary partitions and tarpaulins. Showers of sparks and hot flux from acetylene torches alternated with the hazards of roof openings during summer squalls to keep fire and bucket brigades alerted. As this report year ended, the new stack addition was still a hollow shell, with any hope of return to normalcy projected well into the coming year.

Statistics

Although the concentration of visitors in one reading room and a succession of creature discomforts reduced the total attendance figure, there was an increase in the number of volumes

* 1 November 1954–31 October 1955

circulated both within and outside the building, which is a tribute to the loyalty, patience, and tenacity of purpose of the library's clientele. Another statistic which demonstrates man's high degree of tolerance to chaos is the fact that the displaced cataloging staff processed more volumes than during the previous year. The library's photoreproduction service also established a new record, despite its transplantation to a corner of the kitchen in the basement.

Serials

The inexorable flow of medical journals was no respecter of the discommodity created by the abandonment of the Periodicals Room for 12 weeks or of the necessity of sharing the Periodicals Room with the library's reference and circulation functions for another six weeks. Personnel-wise, it was the first full year for the new Serials Librarian and it was a year in which the assistantship changed hands.

The liquidation of part of the library's Reserve Collection provided the wherewithal to acquire a Kardex visible checking system with a capacity of 2,400 titles. The change-over from the library's old 3 x 5 cards will require many months.

An aggressive policy instituted by the Editor of the *Transactions & Studies* and the Serials Librarian has resulted in the receiving of many journals by exchange which were formerly purchased or received irregularly as hand-me-downs from a variety of sources. The library is continuing its initiative in this matter and the full extent of the benefits of this program should be apparent by the time of next year's report.

The complete chaos engulfing the shelving for duplicates in the basement of the College has precluded any formal duplicate exchange activity during the year. The College library's scavenging instincts have continued unabated despite lack of storage space or regular means of transportation.

The Serials Department established new regulations for the circulation of unbound journals from the Periodicals Room. A letter was sent to all of the library's institutional borrowers tabulating the new loan periods as follows:

All English language journals:

a. The latest issue circulates for one day and can be renewed daily for a total loan period not to exceed one week.
b. All other issues circulate for three days and can be renewed every three days for a total loan period not to exceed two weeks.

All foreign language journals:

a. The latest issue circulates for three days and can be renewed every three days for a total loan period not to exceed two weeks.
b. All other issues circulate for two weeks and can be renewed once.

Material that has been renewed is subject to 24-hour recall.

It is hoped that this revision of the rules will stimulate use of this important block of material.

Revision of Fees

A study of the classifications of registered library borrowers showed a surprisingly small number of non-Fellow physicians enrolled in the category for physicians who have had their degree for five years or more. This discovery prompted a survey of subscriptions in a number of similar libraries in different parts of the country. This survey led to a reduction of this fee from $25.00 to $15.00 per year. It is still too early to evaluate the effect of this reduction.

Dissertations

The heavy pressure of current accessions upon a limited cataloging staff necessitated a simplification of foreign thesis cataloging. English language dissertations will continue to receive full cataloging but foreign language theses will merely be filed in the stacks by the name of the university awarding the degree, by the year of the degree, and by the author's name. In this way it is possible to locate dissertations if the citation is known but there will no longer be subject entries in the card catalog for foreign

language theses. Formerly foreign dissertations were cataloged when they had English language abstracts. This processing decision will not affect the library's policy of acquiring as many medical dissertations as possible.

Osler Library Representation

The Chairman of the Library Committee, who is, ex-officio, one of the Curators of the Osler Library at McGill University, represented the College Library at the annual meeting of the Curators in Montreal.

Personnel

Mr. McDaniel began the trend toward decentralization of administrative responsibility in July 1949 when he recommended the appointment of an administrative assistant librarian. Following the appointments of the present Librarian and the present Curator of the Library's Historical Collections in June 1953, this policy was amplified in January 1954 by the appointment of two assistant librarians who were assigned responsibility for the Preparations and Readers' Service Divisions. During the first year of these appointments, the pressures of the assistant librarians' routine duties prevented the fullest development of this new administrative plan. However, this development was accelerated this year by the exigencies of the building program. All major policy decisions were discussed to advantage by this administrative group. Consultations were held with other department heads as their interests were affected.

At the close of the current year, the College administration granted the library's request for an additional library assistant to provide more time for the assistant librarians to more fully develop the administrative potentialities of their jobs. It was of interest to note the *Bulletin of the Medical Library Association* editorializing on this subject in the October 1955 issue, as follows, "Librarians who refuse to delegate authority . . . are not only piling unnecessary work on themselves, but are hampering the professional growth of their staffs who should be learning to take responsibility and make decisions." (p. 553)

The editorial also indicates that the growth of the institution itself is prevented by the one-man rule of the so-called "Indispensable Librarian". A library's policies and routines should be under constant reexamination from more than one point of view. In the event of the necessity to replace the Librarian, the library staff should have within it sufficient strength for competent interim administration or potential replacement material. The amount of oral tradition and information known only by one individual should be kept to a minimum. The College's present policy should insure a flexibility of personnel and a strength in depth that will guarantee continuity of growth of the library.

Professional staff activity

The Medical Library Association appointed library staff members to the following positions: William K. Beatty is Chairman of the Periodicals and Serials Publications Committee and Editor of *Vital Notes*. He is a member of the Bibliography Committee and Secretary of the Medical Society Group. Mrs. Virginia Beatty is a member of the Periodicals and Serials Committee. Elliott H. Morse is a member of the Gifts and Grants Committee and is the Association's representative on the Joint Committee to Study Relations between libraries in the United States and the Federal Government. Four members of the library staff attended the annual convention of the Association which was held in Milwaukee.

The Philadelphia Regional Group of the Medical Library Association has drawn on the College Library staff for the following assistance: Mrs. Virginia Beatty is Chairman of the Program Committee. Muriel Hodge is Vice-Chairman and Chairman-Elect of the Group. Lillian Ceci serves on the Group's Membership Committee.

Staff members participating in the activities of the Special Libraries Council of Philadelphia & Vicinity are: William K. Beatty who is Chairman of the Employment Committee. He

is also Vice-Chairman and Chairman-Elect of the Science-Technology Group of this organization. Mrs. Virginia Beatty is Chairman of the Hospitality Committee. Elliott H. Morse serves as Managing Editor of the *Bulletin of the Special Libraries Council of Philadelphia.*

Mrs. Virginia Beatty was voted Chairman for the Metals Division—Special Libraries Association booth at the National Metal Exposition in Philadelphia. She was in charge of registration at the Philadelphia meeting of the American Documentation Institute and gave a paper on medical bibliography. Mrs. Beatty also gave a talk in the Graduate School of Medicine of the University of Pennsylvania's symposium on medical writing.

Several staff members are continuing academic studies. Muriel Zeldis and Elizabeth Colabrese are working for their library science degrees at Drexel Institute. William K. Beatty completed a course at Columbia University during the summer which qualifies him for certification by the Medical Library Association.

The Editorship of the *Transactions & Studies* of the College was kept in library staff hands when it was transferred from W. B. McDaniel 2d to William K. Beatty.

Mr. McDaniel's activities are noted in the historical portion of this report.

Benefactors

A list of the donors of books and other library materials appears in the statistical section of this report.

The library is pleased to be able to report the following institutional subscriptions to the support of the library made under the terms of the Contribution Plan:

Sharp & Dohme
Smith, Kline & French
National Drug Company
Wyeth Laboratories
McNeil Laboratories, Inc.
Air-Shields Inc.
J. T. Baker Chemical Co.
Bernstein & Bernstein
Chew, Harvey, & Thomas
Dickman Laboratories
E. I. du Pont de Nemours Haskell Laboratory
Eaton Laboratories
Freedman, Landy, & Lorry
Gray & Rogers
Industrial Toxicology Laboratories
La Wall & Harrisson
Lee Ramsdell & Co.
MacAndrews & Forbes Company
Chas. Pfizer & Co.
Quaker Chemical Products Corp.
Richter, Lord & Farage
Rittenhouse Book Store
Rohn & Haas Company
Samson Laboratories
Squibb Institute for Medical Research
Henry K. Wampole & Company, Inc.

E. H. M.

MEDICAL LITERATURE SERVICE

During the past year MEDICAL LITERATURE SERVICE has served individuals and organizations both in and out of Pennsylvania. The volume of work done was almost exactly twice that done in 1954. In this same year Miss Carr, Assistant to the Director, became Mrs. Stevens, and the Service profited greatly from its association with Dr. A. Tillema van Ormondt, former editor of the Pediatric Section of *Excerpta Medica.*

In providing extended reference service for the users of the library, and in implementing its object of making available a complete bibliographic service to the medical and allied professions in the area, 1955 can be compared with 1954 as follows: From going through the 2000 serials received in the library, references from the current literature were sent out monthly (or weekly) to 9 subscribers, in 21 subjects, in 1955, as against 7 subscribers, in 18 subjects, in 1954. Annotations were made of 317 foreign language articles and 105 English language articles. 107 searches of the literature were made in 1955 as opposed to 82 in 1954, and there was a higher percentage of longer searches. Bibliographies were checked for 21 journal articles and 3 books. All medical translations were done by M.D.'s, and chemical, pharmacological, and biological papers were done by persons with similar subject training. 166 translations (17 languages) were made in 1955 as against 93 in 1954.

The activity of the past year seems to imply that MEDICAL LITERATURE SERVICE is continuing to serve the different requirements of its varied and increasing clientele.

V. L. B.

HISTORICAL

The Curator's recent paper entitled "Expanding the Use of the Library's Historical Collections" (the College's *Transactions & Studies*, February, 1956) covers some important matters that would normally have found their way into this report. The paper is concerned primarily, however, with the present and future, whereas an annual report must also—perhaps primarily—account for the immediate past. Ordinarily not a difficult period to sum up, circumstances may make it as difficult to reconstruct as is the life lived during our sleeping hours. Such circumstances having prevailed during the larger part of the period covered by this report, there is possible only a fragmentary reconstruction of our life with the artists and the artisans creating a better mouse-trap for us.

Some Acquisitions:

Incunabula

Estwood, John. Summa astrologiae judicialis. Venice, Santritter for Bolanus, 1489. Stillwell E84.

A famous 14th century work that contains some 70 folio columns of medical text that was long regarded as authoritative. Thorndike (who devotes an entire chapter to the author) singles out the discussion of pestilence as important, as it constitutes one of the first contemporary pest tracts. It shows that the contagious nature of the disease was recognized almost from the start. This is the only 15th century edition; though copies are not exceptionally rare, this is the only recorded one in this area.

Villardiga, Antonio, Juyzio . . . para el año de M.d. [y de M.d.j y ij]. S.l.a. et typ. n. (Vindel, F. El Arte Tipográfico en España durante el Siglo XV. Salamanca (etc.), no. 129. Madrid, 1946.)

Apparently the only recorded copy of a Spanish almanac, or prognostication, published shortly after the appearance of syphilis in Europe. Palau records later prognostications by Villardiga. A brief account of this 15th century one may be found in an early 1956 issue of the Library's *Fugitive Leaves*.

The recent publication of a catalogue of the incunabula in the Wellcome Historical Medical Library, London, led to a little doodling in this library. Checking the Wellcome catalogue, those of the Armed Forces Medical Library collection, the Boston Medical Library's, and our own against Klebs' "Incunabula Scientifica et Medica", we found that 56% of the Wellcome titles were listed in Klebs; 61% of the Boston Medical Library's; 79% of our own; and 86% of the Armed Forces Medical Library's. Interested also in the amount of duplication in this country, we found that 49 of our editions are not duplicated (according to Stillwell); 88 are to be found also in both the Armed Forces Medical Library and the Boston Medical Library; 154 others in one or other of those libraries; and the rest in various other libraries. Any attempt to interpret these figures will properly take into account the fact that, in the period when these "medical" collections had their greatest growth, the tendency was to add to them any title likely to have been contained in the library of a learned late-15th century physician; and the fact that a great number of the titles (often published in but one or two editions) would be required in any such collection that pretended to usefulness. In this mellow light, we verge on a non-belligerent sense of satisfaction over our 49 *unica* (U.S.A.), and our 79% of titles medical and (or) scientific.

16th Century

Austrius, Sebastianus. De puerorum morbis, et symptomatis tum dignoscendis, tum curandis liber. Lyons, 1549.

"Sebastian adopted and mutilated the work of Roelans . . ." (Still). "Sudhoff says that Oestereicher made out of Roelans a readable book, readable in the sense of the sixteenth century. The work was popular or at any rate it was reprinted various times, notably by Gulielmus Rovillus in Lyons in 1549" (Ruhräh).

Dispensarium usuale pro pharmacopoeis inclytae reipub. Colonien. ex commissione ampliss. nobilium, atque prudentium & fortium, coss. procoss. que venerandi sanctique senatus eiusdem florentissimae republicae. Cologne, heirs of Arnold Birckmann, 1565.

The third municipally sponsored pharmacopoeia

to be published in Germany, the fifth in Europe. It was the first to serve also as a textbook—144 pages are devoted to description of drugs and their alterations. Like most of the early pharmaceutical literature in Germany, this dispensatory was compiled by physicians: Hubert Faber, a professor in the medical school, who had as collaborators Bernard Dessen, of Kronenberg, Johann Echt, and Theodor Birckmann. It is of interest that Faber, Dessen, and Echt had all come to Cologne from the Netherlands, where municipal pharmacopoeias appear not to have been published until the 17th century. Birckmann, presumably, was a member of the publishing family.

Linocier, Geoffroy. L'histoire des plantes, simples aromatiques, animaux à quatre pieds, oiseaux, poissons, serpens, & bestes venimeuses, ensemble les distillations, avec leur pourtraits & figures. Paris, C. Macé, 1584. *Presented by Frederick Fraley, M.D.*

A very rare, 1,000-page, herbal (in effect, a "Book of Nature", like many of the older ones), by a French physician, that is said to be based in part on Mattioli and Fuchs. It lacks the title, and some other, pages (the Privilége supplied the identification), and some sections are bound out of sequence; but the indexes are intact, and with the extensive surviving text provide a welcome key to correspondences between the Latin and French terminology in the 16th century.

Paduanius, Joannes, *Veronensis*. De singularum humani corporis partium significationibus. Verona, Hieronymus Discipulus, 1589.

Physiognomy—somatotyping might be regarded as a modern aspect of the subject—has engaged the attention of numerous scientists (as well as non-scientists) for many centuries, as the library's fairly representative collection on the subject could testify. This work claims to bring together the views of Albertus Magnus, Aristotle, Avicenna, Averroes, Cassiodorus, Constantinus, Hippocrates, Isidorus, Melampus, Meletius, Michael Scotus, Polemon, and Remigius, most but not all of whom would find their names in our catalogue. Paduanius published a quarter of a century earlier an astrological work called *Viridarium Mathematicorum* (Garden of Mathematicians), in which he is styled professor of the liberal arts. A copy is in the library. De Renzi, following Haller and other bibliographers, describes the present work as a sort of anatomical dictionary, failing to note that the dictionary aspect is subservient to the author's intent, which was to offer a treatise on physiognomy, as Thorndike has recognized.

Pratensis [à Pratis], Jason. De pariente et partu, liber. Antwerp, 1527. An early book on obstetrics by a Netherlands physician whose surname is said to have been van der Velde or van der Meersche.

17th Century

D'Amato, Cintio. Nuova, et utilissima prattica di tutto quello, ch'al diligente barbiero s'appartiene . . . Per Tomaso Antonio Riccio ristampata. Naples, G. Fasulo, 1671.

A popular illustrated manual for barber surgeons, first printed at Naples in 1630 (as noted in the colophon; the edition was evidently not known to Haller, De Renzi, *et al.*), and then at Venice, 1669, neither edition being in the library. D'Amato's striking observations on medical specialization (quanti sono membri nel corpo humano: tante hoggidì sono varie specie de Medici, & di medicine), and on the relationship of the barbers to the physicians and surgeons and quacks, appear not to have been drawn upon by medical historians.

Scholzius à Rosenaw, Laurentius. Consiliorum medicinalium, conscriptorum à praestantiss. atque exercitatiss. nostrorum temporum medicis liber singularis. Hanau, heirs of J. Aubrius, 1610.

The body of the text contains sections, totalling 1,164 folio columns, on the diseases of men and youths, of boys, of women, of young women (virgins), of girls. The editor, Scholtz, culled passages from the writings of forty 15th century physicians, the names of twenty-three of whom were not to be found in our catalogue. Scholtz himself (1552–1599; the first edition of this book was published in 1595) was a famous Silesian physician and botanist, the author or editor of several popular works, none of which, rather strangely, had previously found its way into our library.

Stearne, John. Thanatologia [in Greek characters], seu, de morte dissertatio; in qua, mortis natura, causae, mobilitas, remorae & remedia proponuntur. Dublin, 1659. *Presented by J. Monroe Thorington, M.D.*

Stearne, an important figure in Irish medicine, studied medicine at Cambridge and Oxford, received his M.D. in Ireland in 1658, at which time he was lecturing in Hebrew. He founded the "President and Fraternity of Physicians", Dublin, in 1654, later to become the College of Physicians in Dublin, of which he was named president for life.

18th Century

Billi, Domenico, *d'Ancona*. Breve trattato delle malatie degli occhi. Ancona, Bellelli, 1749.

Billi's purpose, he says, is to make available to Italian surgeons, in their own tongue, the choicest observations of foreign authors, along with some

observations and experiences gained from his own surgical practice in various large cities of the Ecclesiastical State. He has studied in several large foreign universities, particularly in Paris, where for a long time he was the guest and disciple of the renowned surgeon Sauveur-François Morand. It may be said that, on the evidence of the authorities he cites, there seems to be a sound basis for his claims. Aside from a few references to classical authors, a slightly larger number of them to reputable authors of the 17th century who were still generally regarded as authorities, the majority are to such distinguished contemporaries of the author as Albinus, Boerhaave, Cheselden, Dionis, Garengeot, Heister (his major authority), Mareschal, Morgagni, Peyronie, and Valsalva, with the ophthalmologists Brisseau, Maître-Jean, Saint-Yves, and Woolhouse frequently represented. The text is divided into three parts: 1) on diseases of the eyelids and eye-lashes, and on foreign bodies injuring the eye; 2) on diseases of the conjunctiva, cornea, uvea, iris, retina, aqueous humor, vitreous humor, and crystalline lens; 3) on diseases of the globe and orbit, and of the internal angle. A large folding plate contains figures of 13 instruments that are described in the text.

Cogrossi, Carlo Francesco. Della natura, effetti, ed uso della corteccia del Peru' o' sia China China, considerazioni fisico-mecaniche, e mediche. Crema, 1711. This Italian physician is now regarded as having been well in advance of his time. The only other work of his listed in our catalogue is the "New theory of the contagious disease among oxen" published, in facsimile and with translation, by Schullian and Belloni, in 1953.

Miranda, João Cardoso de. Relação cirúrgica e médica. Lisbon, 1741.

Like most of the coastal countries, Brazil and Portugal were plagued by scurvy for centuries. This Brazilian physician describes the disease, and treats as well of fevers, erysipelas, blisters, measles, carbuncle, and bubo. According to Ferreira de Mira, he presents a specific for scurvy, but (writing a dozen or so years before Lind's treatise appeared) forbids the use of fruits, particularly acid ones!

Tennent, John. Physical enquiries . . . 2d ed. London, 1749.

In this work, the colorful Anglo-American (Virginia) physician, who achieved notoriety for his promotion of rattlesnake root (Seneca) as a specific for many diseases, attacks the College of Physicians for recommending vinegar to His Majesty's fleet for the prevention of epidemic fever, giving his own remedy; discourses on the barren state of medical knowledge at the time, and attacks the famous quack Joshua Ward.

Tennent, John. A reprieve from death in two physical chapters. Viz. Chap. I. Objections against the use of vinegar . . . Chap. II. Reasons why all medicines should be freely published. London, 1741.

Chap. II is an important early statement opposing secret remedies.

19th Century

Paiva, Manoel Joaquim Henriques de. Farmacopea Lisbonense ou collecção dos simplices, preparações, e composições mais efficazes, e de maior uso. 2d ed. Lisbon, 1802.

Henriques de Paiva is said to have exerted a strong influence on Portuguese medicine in his time through his many translations of European authors, especially the systematists, and through his own publications. First published in 1785, this pharmacopeia indicates the drugs and simples the author regarded as active and effective, as well as those he viewed as being valueless. It is the only one of his publications in the library.

Tavares, Francisco. Observationes, et epicrisis de corticis Peruviani salutari, et proficuo usu in podagra. Lisbon, 1802.

Like Sydenham, who suffered from gout and surmised that Peruvian bark would someday be useful in treating it, Tavares suffered from the same disease, as witness the amusing dedication of his little treatise "to the professors of medicine and to sufferers from gout, my colleagues". Tavares' major works (not in the library) were in the field of pharmacology, in which he held a professorship at the University of Coimbra, later becoming chief physician to the King of Portugal. This text (in Latin and Portuguese on facing pages) was also published in French in the same year.

Williams, W(illiam) H(enry). A concise treatise on the progress of medicine since the year 1573. Ipswich, 1804.

The starting date, 1573, is that of the death of John Kaye (Caius), co-founder of Gonville and Caius College, Cambridge University, of which Williams was, at the time of writing, an M.B., later (1811), an M.D. His narrative starts with Harvey (though with a retrospective glance at Galen, Vesalius, Servetus, Columbus, and Caesalpinus) and concludes with his contemporaries Beddoes, Baynton, and Jenner. Williams made a considerable name as an army surgeon, and published several other works, none of them being in the library.

Autographs etc.

Fritz T. Callomon, M.D., Collection of Letters Written to Richard von Volkmann (1830–1889). This personal collection of letters to the great German surgeon and influential champion of

Lister's wound treatment was generously donated to the Library by Dr. Callomon, a frequent and welcome visitor in recent decades. The writers represented are K. von Bardeleben, E. Bergmann, W. Busch, H. T. Butlin, H. W. Farnam, W. Hagedorn, A. Hegar, H. Heiberg, C. Hueter, T. Kocher, L. Labbé, B. von Langenbeck, H. Maas, W. Manassein, A. Moosetig-Moorhof, F. Niemeyer, J. von Nussbaum, A. Reverdin, J. Reverdin, C. Reyher, G. Simon, L. Thiersch, D. P. Turner, P. H. Watson, K. Webster, T. S. Wells, R. Wunderlich. The collection contains also a letter written by Volkmann himself. The donor has further put us in his debt by providing translations of the letters, an introduction, and notes on them.

Sir Joseph Banks (1744–1820). Through our Fellow *Dr. Harry P. Schenck*, the Library was presented with a manuscript letter informing Sir Joseph Banks, the great British naturalist, of his election to the first honorary membership in the Royal College of Surgeons of England; and, accompanying it, the official certificate of his membership. Happily, the Royal College still has Sir Joseph's letter in which he expressed his gratitude for the honor. A fraternal exchange of photostatic copies gives both institutions ready access to the contents of these interesting documents.

Sir James Crichton Browne (1840–1938). From *Dr. Burton Chance*, faithful friend to the Library, came nine holograph letters written to him, 1926–36, by this well-known physician and medical philosopher; two early photographs of Sir James, and a letter from his wife. At the age of 65, Sir James published a book entitled "The Prevention of Senility and a Sanitary Outlook" (unfortunately, it is not in our library). One of these letters was written at the age of 96—in a hand, and with a clarity and felicity of expression, that most of us could not exhibit even in the summer solstice of life.

Clemens von Pirquet (1874–1929). To the *Pediatric Society of Philadelphia* thanks are due for the gift of a letter from one to whom we owe, among other important contributions, the introduction of the term *allergy*.

S. Weir Mitchell (1829–1914).

"March 26th, 1907

"Dear Doctor Cross:

I go out to see Blessing and then I get notes from him in place of letters from you or that clever young doctor of yours.

I gave the man full doses of Salicin and I do not know whether they really upset him or not; but the only way is to lessen them and go on again. It is what he needs. He talks about his pulse being 70 as abnormal. I should like to know, if I am to be consulted at all, whether the applications of hot water have been of use and what of the bandages. If he has had a humming in the head it is only a pecsalicin and will do no harm. I am sorry to trouble you but it is one of those difficult patients who takes all our energy and all our courtesy.

Very truly yours

Weir Mitchell"

This delightful letter was written to Dr. William A. Cross, a former Fellow, and, through the good offices of our friend *Mr. Richard W. Foster*, was presented to us by *Mrs. Sumner H. Cross*, whose late husband also was a Fellow.

Benjamin Rush. Miss Frances Bradford, kindly following a suggestion by our past-president *Dr. T. Grier Miller*, donated a very interesting bill submitted (1800) by Benjamin Rush to Samuel F. Bradford, of the famous early Philadelphia publishing family, who were friends as well as patients of Rush. The Rush dossier was also increased by a letter (1854) of Benjamin's eminent son Richard, sent from the family country seat, "Sydenham, near Philadelphia", and presented by another good friend and Fellow, *Dr. William G. Leaman, Jr.*

George B. Wood (1797–1879). "Journal No. 3rd", 1836–1849. *Presented by Harold Bacon Wood, M.D.* "Journal No. 1st", 1817–1829, was privately printed in 1939. The 3d journal, covering a professionally more important period, is both more extensive and richer in content. It is a signal addition to our Wood Room, whose manuscript holdings still await systematic study by someone interested in

this distinguished leader in the advancement of American materia medica, who, among other honors, had that of presiding over this College for 30 years, by far the longest tenure in the history of the College.

Other Acquisitions

Not through design, doubtless, but through oversight, checking of medical biblical references could not have been accomplished in the library until the recent receipt of the *family Bible of Philip Syng Physick*, the father of American surgery. This Bible (Worcester, Mass., Isaiah Thomas, 1791), with its valuable vital data, was the welcome donation of *Mr. Walter H. Scott*, through our Fellow *Dr. Craig Mucklé*. (It is not to be supposed, however, that this copy will be available for routine use!)

Early Philadelphia Medical Schools. Dr. William G. Leaman, Jr. presented two printed receipts for loans issued in 1849 by, respectively, the *Homeopathic Medical College of Pennsylvania* and the *Medical Department of Pennsylvania College*—interesting documentary evidence of the uneasy financing of the first homeopathic school in the country and that of the school which Jefferson's founder, Dr. George McClellan, established when he was dismissed from the Jefferson faculty, in 1839.

Dr. Joseph Hepburn, a Hahnemann scholar and long one of the library's friends, obtained for us, from his friend *Lees Malcolm Schadel, Jr., M.D.*, four medical documents deriving from the latter's great-uncle C. H. Wilde, who practiced medicine in this vicinity about 1860. These are 1) an M.D. diploma awarded to John Charles Wm. Wilde by the *American University of Philadelphia*, 1870; 2) an elaborate engraved receipt (1869) to the same, from the same, for $60, entitling Mr. Wilde to full instruction in specified courses; 3) a certificate (Session 1873–4) of the *Eclectic Medical College of Pennsylvania*, partly printed and engraved, partly manuscript, signed by W. H. Mathews, testifying to C. Wilde's having satisfactorily completed Mathews' course in operative surgery; 4) an engraved certificate awarded (1874) to J. C. Wilde by the medical board of the *Philadelphia Hospital* for faithful and zealous attendance at the clinical instruction of the institution.

Miscellaneous

Exhibits. Despite the unfavorable physical conditions, exhibits (though necessarily little more than gestures of goodwill) were provided for the Philadelphia Art Festival, the Carlos Finlay commemorative meeting, the College's public lectures, and the meetings of the Section on Medical History.

Notes on College Lectureships. As an aid to the College's eight lectureship committees, and to the speakers selected, notes on the individual lectureships were prepared, indicating the origin of the lectureship, its stated purpose, and the lecturers through 1954. Copies of the mimeographed notes are available on request to the curator.

Leaman Lantern Slide Collection. An index to the William G. Leaman, Jr. Collection of Lantern Slides on Medical History was prepared, and mimeographed copies are available on request to the curator.

Packard-Krumbhaar Alcove. It seems fitting to note here, as elsewhere, that the "New History Corner" described in our last report has been designated the Packard-Krumbhaar Alcove. This is, of course, a tribute to two former presidents of the College—Dr. E. B. Krumbhaar and the late Dr. Francis R. Packard—that will be warmly endorsed by all those who know of their great contributions to the library's historical collections and to the development of American medical historiography.

Personnel. The curator, at his request, was relieved of the editorship of the College's *Transactions & Studies*, in order that he might devote full time to the work of the historical department. In July, he read a paper, "Some Historical and Contemporary Aspects of Bibliotherapy", before the Hospital Libraries Division of the American Library Association. Publication later is anticipated. Book reviews

from his hand appeared in the *Bulletin of the History of Medicine* and the *Journal of the History of Medicine*, the latter containing also a note on the Carlos Finlay meetings. The latter weeks covered by this report saw considerable time going into the preparation of papers scheduled for reading and (or) publication outside the time limit of the report. It is hoped that Fellows and others interested in the library's work in the historical field will turn to one of these, that mentioned at the beginning of the historical section of the report, for a glimpse of the road into the future.

W. B. McD., 2d

STATISTICAL SUMMARY

Inventory

	1955	1954
Total number of accessioned[1] items	189,542	186,854

	1955	1954
Incunabula	(421)[9]-419	419
Manuscripts (including a few typescripts)	799	796
General	183,991	181,319
Accessioned pamphlets	4,333	4,320
	189,542	186,854

	1955	1954
Total number of unaccessioned[1] items	326,615	325,610

	1955	1954
Reports	28,290	28,015
Periodicals "reserve"[2]	9,542	9,332
Theses and Dissertations	57,678	57,166
Pamphlets and reprints	231,105	231,097
	326,615	325,610
Total number of current periodical publications and serials regularly received	1,977	1,930
Portraits[3]	94,572	91,297

Distribution of This Material

	Accessioned Items	*Unaccessioned Items*
General Library (including the Lewis Library)	185,171	326,611
On permanent deposit:		
Gross Library	3,954	4
Parry Library of the Obstetrical Society of Philadelphia	217	0
Mütter Museum[4]	200	0
	189,542	326,615

[1] Accessioned items in this library comprise the total number of bound volumes and such unbound pamphlets as have been catalogued as separate bibliographical units regardless of their size.

There remain many thousands of unaccessioned pamphlets awaiting accessioning and cataloguing. A true quantitative and qualitative picture of the library's holdings can not be presented until this wealth of neglected material has been processed and duly registered in our 'accessioned', or 'volume', count.

[2] More-or-less complete duplicate volumes of periodicals.

[3] Including 123 oil, and 430 other, framed portraits in the care of the Committee on College Collections. The count of portraits represents the number of entries on the cards in the portrait catalogue. The entries represent, in turn, both loose portraits and those in books, many of them, of course, being merely different reproductions of a single original.

[4] The books of the Mütter Museum are not permitted to be removed from the College building.

CURRENT SERIALS

	Purchase	*Gift*	*Exchange*	*Total*
U. S. A.	346	355	62	763
Western European Continent	640	25	38	703
Latin America and West Indies	40	55	58	153
United Kingdom and Eire	126	21	16	163
Canada	7	19	9	35
Eastern European Continent	25	3	4	32
Asia (including Japan)	18	29	32	79
Africa	4	4	11	19
Pacific (including Australasia)	4	8	8	20
United Nations	10			10
Grand Total: 1955	1,220	519	238	1,977
Grand Total: 1954	1,189	[5]	[5]	1,930

[5] 1954 gifts and exchanges totalled 741. Separate figures first recorded in 1955.

New titles: A total of 40 serials was added in 1954–55. Twenty-one of these were purchased; nineteen received in exchange or gratis.

Separate Issues received, checked-in on the cards, and shelved totalled 15,830. In addition, thousands of duplicate issues were received as usual; 210 of these were retained for our 'reserve' files, no attempt being made to count those held merely for exchange or other use.

Visitors in the Norris Room for the year totaled 2,249[6].

[6] The Periodicals Room was closed for five months during the period of reconstruction.

READERS' USE OF THE LIBRARY

Library Hours. The library was open, during the academic year, from 9:30 to 9:30 on Mondays and Wednesdays; from 9:30 to 5:30 on the other weekdays. During the latter half of June, in July, August, and the first half of September the Library was open from 1 to 9:30 on Tuesdays; from 9 to 5 on the other weekdays, except Saturdays, when it was closed. The following legal holidays were observed: Thanksgiving, Christmas and New Year's (and the half day preceding each), Memorial, Independence, and Labor Days.

Visitors:

	Totals	*Reading Room*	*Periodicals Room*
1955:	10,732	(8,483	2,249)[6]
1954:	12,973	(8,516	4,457)

Circulation:

	Totals	*Intra-mural*[7]	*Extra-mural*	*Books*	*Journals*
1955:	45,253	33,481	11,772	8,391	36,862
1954:	41,084	30,866	10,218	8,299	32,785

[7] The number of volumes "consulted in the library" includes only those supplied on demand. Readers have access to the bound volumes of periodicals and reference works kept on the shelves in the Reading Room; the Fellows, and occasionally others, by special permission, have access to the book-stacks. There are, therefore, many volumes consulted of which no accurate record can be kept.

Inter-library loans: The library sent 3,532 (1954: 3,462) volumes on inter-library loan to 129 (1954: 126) libraries in 28 (1954: 28) States and 2 Provinces and has borrowed 4 (1954: 2) volumes from 2 (1954: 2) libraries.

Photostats: 4,309 photostatic prints were furnished on request (1954: 3,714).

Acquisitions and Accessions

Accessioned Acquisitions:

1955: 2,688 volumes (1,709 by purchase; 746 by gift; 233 by exchange). (*Books:* 829; *Periodicals:* 1,843 *Pamphlets:* 13; *Manuscripts:* 3)

1954: 2,800 volumes (1,737 by purchase; 903 by gift; 160 by exchange). (*Books:* 867; *Periodicals:* 1,933); 143 pamphlets.

Non-accessioned Acquisitions[8]*:*

1955: 275 Reports (1954: 447)
512 Theses (1954: 334)
324 Miscellaneous items (1954: 139)

Donations

The donors for the past year number 208 (1954: 230). The library is indebted for large gifts of books, pamphlets, and unbound periodicals to the following donors: Drs. R. Chamberlain, D. M. Davis; Jefferson Medical College Library; Drs. R. A. Kern, E. B. Krumbhaar; Lea & Febiger; Dr. F. H. Leavitt; J. B. Lippincott Co.; W. B. Saunders Co.; Smith, Kline & French Laboratories; South African Institute of Medical Research; Drs. P. Williams, I. Wolman; Woman's Medical College.

Various publishing houses, among the large group of corporate donors, have presented volumes as follows: Blakiston Division (McGraw-Hill), 5; F. A. Davis Co., 11; Lea & Febiger, 19; J. B. Lippincott Co., 22; W. B. Saunders Co., 65.

Other individual donors were as follows: Drs. D. Amram, J. Appleyard, J. Arnett, H. Beerman, S. Bellet; Mr. C. W. Bellingrodt; Dr. C. Berens; Mrs. P. G. Blackmore; Drs. C. W. Bonney, W. N. Bradley, I. Bram, F. Callomon, W. E. Chamberlain, B. Chance; State Senator T. C. Desmond; Mrs. C. Derby through Dr. H. P. Schenck; Dr. M. B. Donaldson; Mrs. H. Ecroyd; Drs. O. S. English, L. L. Feldman, T. Fay, F. Fraley, R. Friedman, J. E. Gregory, J. Q. Griffith, Jr., E. Hess, J. C. Howell, C. Jackson, C. L. Jackson, J. M. Job; Mr. T. E. Keys; Drs. J. J. Kirschenfeld, J. V. Klauder, A. Lamont; Miss O. Lang; Dr. W. G. Leaman, Jr.; Mr. W. B. McDaniel, 2d; Drs. D. MacFarlan, M. A. Michels, C. W. Mucklé; Mrs. Norris; Mrs. A. J. Ostheimer, 3rd; Packard Estate Books; Dr. G. E. Pfahler; Mr. C. Proskauer; Drs. S. X Radbill, J. B. Rudolphy, L. M. Schadel through Dr. J. Hepburn, L. C. Scheffey; Mr. W. H. Scott through Dr. C. Mucklé; Drs. M. W. Shutkin, C. N. Sturtevant, J. M. Thorington, L. M. Tocantins, G. Tortelli, E. V. Ullman; Mrs. J. E. Weeks; Mrs. G. B. Wood; Drs. H. B. Wood, W. Woodward, W. Zentmayer.

[8] As usual, not all the pamphlets, theses, and numbers of various journals listed as received had been checked for keeping or discard at the close of the library year.

Exchanges

The *Transactions & Studies* was sent, either in exchange or as gift, to 287 organizations.

The library received a number of journal issues through the Medical Library Association Exchange and USBE and supplied duplicate journals to other libraries through a variety of channels.

Theses and dissertations to the number of 391 have been received on exchange from the following European schools of medicine: Universities of Basel, Bern, Erlangen, Lausanne, Leiden, Louvain, Paris, Uppsala, Utrecht.

Work of the Cataloguers

	1955	*1954*
Accessioned items catalogued or recatalogued	846	815
Unaccessioned items and Fellows' reprints catalogued by author or by author and subject	77	37

The Staff

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Assistant Librarian
Readers' Service
William K. Beatty

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BURTON CHANCE
Chairman

ELLIOTT H. MORSE
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Curator of the Library's Historial Collections

[9] Difference due to several titles bound together and assigned one accession number.

Increase in Subscription Rate

Increased costs have necessitated a change in the subscription rate. Beginning with volume 24, number 1, June, 1956, all subscriptions will be at $5.00 a year ($1.25 for a single issue).

Annual Report of the Committee on the Mütter Museum and College Collections*

The Mütter Museum attendance was somewhat curtailed in 1955 because of building operations. For six months all cases in the Museum were boarded up while the new lighting system was being installed. There were, however, more than 1600 visitors during the year because of several well attended all day meetings at the College toward the end of the year, and the attendance of classes from some of the schools before work had begun. Among these were thirty-two students from Gillespie Junior High School, forty-five students from the Franklin School of Arts and Sciences, thirty pupils from the Philadelphia Museum School of Art and students from Northeast High School who were interested in a medical career.

One evening in March Dr. James R. Cameron brought fifty students from the James R. Cameron Honorary Society of Oral Surgery at Temple University to the Museum as one of the stated monthly meetings of the group.

As is his custom, Dr. Samuel X Radbill brought a class in obstetrics for a short session in the Museum.

The Museum was open daily, with the exception of Saturdays and Sundays, from 9.30 A.M. to 1.00 P.M. and 2.00 P.M. to 4.30 P.M., and until 8.30 P.M. on the Stated Meeting Nights of the College with the curator in attendance.

The Sixty-eighth Thomas Dent Mütter Lecture was delivered on December 7, 1955, by Dr. Leandro M. Tocantins, Professor of Clinical and Experimental Medicine, and Director of the Charlotte Drake Cardeza Foundation at Jefferson Medical College. His subject was *Platelets, Hemorrhage and Thrombosis.*

The total number of articles on Museum subjects written by the curator and published in either *Philadelphia Medicine* or *Transactions & Studies* has now reached eighty-eight. The article entitled *The Mütter Museum—Then and Now* appeared in the June 1955 issue of *Transactions & Studies*. The exhibit in the Mütter Museum booth at the American Medical Association Convention in Atlantic City in June, consisted of photographs taken by *Mr. Joseph Sunner* to illustrate many of these articles. It is the intention of the committee to place a similar display in various places on certain occasions. After an even hundred articles and illustrations are completed the committee proposes to submit them to a publishing house to be put in book form.

The Museum was the recipient of many gifts during the year. *Mrs. Charles Shepard*, through Dr. Charles Bonney, presented a pocket case of instruments, and a Zentmayer microscope of 1876 was the gift of *Dr. Robert L. Breckenridge.*

An artificial kidney devised by *Dr. Julian A. Sterling*, used in the treatment of acute and chronic uremia, was given to the Museum by the inventor.

Dr. Douglas Macfarlan, who has always been a generous donor, presented an x-ray picture by Dr. Joseph Post, of an eleven year old boy with complete absence of frontal sinuses, the first electric bone conduction receiver for testing hearing, and an early bone conduction receiver devised by F. W. Kranz of the Riverbank Laboratories.

It was through Dr. Macfarlan that *Mr. Gerald W. Jacobson* presented a Western Electric carbon aid, a Western Electric carbon aid with a midget receiver which was the most

* 1 December 1954–30 November 1955.

popular hearing aid before tube sets were invented, and a Unipack hearing aid in which the batteries were attached to the microphone.

Mr. S. J. Herben, also through Dr. Macfarlan, presented a British Medresco hearing aid. These instruments were supplied by the British government, free of charge, to rich and poor, and even to visitors to Great Britain who were hard of hearing.

Other additions to the collection of hearing aids were supplied by *Commander E. F. McDonald Jr.* of the Zenith Corporation and *Mr. Anthony P. Mynders* of the Maico Company. Commander McDonald gave the Museum a 1940 Zenith hearing aid and a Zenith lapel microphone—1955 model—designed to eliminate the noise made by clothing rubbing on the old receiver boxes. Mr. Mynders, who had previously donated much to the collection, presented 1954 and 1955 models of the Maico Transist-ear microphone and a "dummy" Stethetron.

Our spectacle collection was augmented by the addition of a pair of half-spectacles which had belonged to Mrs. Hannah Troth between 1823 and 1879, and presented to the Museum by *Dr. William E. Krewson 3rd. Dr. Frederick Fraley* also contributed an old pair of spectacles dating back to 1800, and an aspirating set for general use.

One of the first electrocardiographs, at one time belonging to Dr. Joseph Sailer, was given to us by *Dr. Truman G. Schnabel.* This will eventually be set up in the new room of the Museum.

Dr. Richardson T. Ellison donated a bleeding instrument of the "schnapper" variety.

Dr. Hannah Morris presented a physician's scale in an individual case, which had been made and used by her father, Dr. J. Cheston Morris.

A handsome replica of Laennec's third stethoscope, the original of which is in the Medical Museum of the Armed Forces Institute of Pathology, was presented by *Sharp and Dohme.*

The new lighting in the Museum is a wonderful improvement. Now all specimens, with the exception of those on top shelves, may be plainly seen. The new room of the Museum, when completed, will be an attractive addition to accommodate future accessions.

Mrs. Ella N. Wade was reappointed curator and clerk-technician for the year 1955–56.

The College Collections

The accessions to College Collections were also quite numerous during the year. Two gavels were presented. One very unusual one, made of mastodon ivory, to be used by the President of the College at all College meetings, was the gift of *Dr. George E. Pfahler.* The other one, a gift of *Dr. Samuel X Radbill*, is unique, being made from the sill of the home of Ephraim McDowell.

Dr. J. Monroe Thorington, a generous donor to College Collections, presented a Victoria Massage Roller, used for obesity and to restore youthful contours, a Maori"Tiki" good luck charm from New Zealand, reading spectacles dated about 1800 from Copenhagen, Denmark, a cardboard disc for eye examination, a test for color blindness and two specimens from Kiruna, Swedish Lapland. One is the model of a Lapp Medicine Man's magic drum, which works something like a Ouija board, and the other a silver amulet, of ancient pattern, against plague. Dr. Thorington also presented an impressive collection of sixteen medical medals and coins among which are several rare Greek and Roman coins. All are very welcome as not one of the sixteen is duplicated in the collection.

Dr. William N. Bradley presented a framed picture of the wax medallion of George Washington made by Patience Wright. At one time the original medallion was in the possession of Dr. Richard H. Harte. Another framed photograph is that of Dr. H. C. Wood, made by his brother Mr. James F. Wood, and presented by *Dr. Harold B. Wood.*

Dr. Burton Chance presented a corneal magnifyer that formerly belonged to Dr. Paul Sartain.

Friends of the late Dr. Alfred Stengel pre-

sented an oil portrait of him by John C. Johansen, which has been hung in Mitchell Hall.

The following oil portraits were restored by Mr. Frank Ireland: John L. Atlee, Thomas C. James, John Foulke, John A. Monges, Thomas G. Morton, Alexander von Humboldt, James Tyson and W.S.W. Ruschenberger.

Dr. Daniel Nicholson, Emeritus Professor in the Department of Pathology at the University of Manitoba, Winnipeg, Canada, who visited the Museum during the winter, was so impressed with the replica of the Laennec stethoscope presented by Sharp and Dohme that he asked if three such copies could be made for him by the same cabinet maker. This we were able to arrange.

The portrait of Dr. S. Weir Mitchell by Holl, which was loaned to the College in 1949 by Mrs. Mitchell Macdonough, was returned to her at her request.

Mrs. Ella N. Wade was reappointed custodian of College Collections for the year 1955–56.

R. Philip Custer
Chairman

Memoir of Henry Paul Brown, Jr. (1888-1955)*

By GARFIELD G. DUNCAN

DOCTOR HENRY PAUL BROWN, JR., an active Fellow of the College of Physicians for many years, was born in Germantown on February 13, 1888, the third son of Henry P. Brown and Annie Taylor Brown, both of whom were born in Philadelphia.

Dr. Brown's preliminary education was obtained at the Germantown Academy. His tall spare stature and muscular fitness made athletics a natural interest for him. He, with his two brothers John and Charles, played on the varsity football team at the one time. Dr. Brown took his premedical course at the University of Pennsylvania where his outgoing personality and athletic ability well fitted him for the active part he took in the Freshman-Sophomore fracases. He entered into these activities with great zest, a fact which, along with his qualification for leadership, no doubt contributed to his being elected President of the Freshman Class. He had a hand in dunking some sophomores in a watering trough after which he was kidnapped one wintry night and taken for a ride without much to shield him from the breezes. He has related that his friends revived him with a double jigger, and that was the only time that straight whiskey tasted good to him.

Upon completion of his premedical course in three years, Dr. Brown entered medical school at the University of Pennsylvania. In his early boyhood he had looked forward to studying medicine and had taken a more than usual interest in those early years in dissecting animals. One of his favorite occupations was to sit in the amphitheatre of Dr. John B. Deaver's Clinic and watch the master work. Upon graduation from medical school in 1912, he entered upon his interneship at the Pennsylvania Hospital. His devotion to this hospital thus begun, never waned during his lifetime, though his clinical activities were to extend also to the Presbyterian, and Children's Hospitals. Eventually he became surgeon to each of these as well as to the Pennsylvania Hospital, and he did Dispensary work at Jefferson under the tutelage of Dr. Francis Stewart.

Upon completing his interneship, Dr. Brown in 1914 married Edith C. Houston of Chestnut Hill. As the family came along, six children in all, two of whom were destined to enter the medical profession, Dr. Brown showed himself more and more a family man. He always had time for his family and took time to train them by example more than by precept, in the skills and attitudes that make life worthwhile. As expressed by one of his sons, "He was there to help with homework, to play baseball, to show us how to chop wood, or to dance, or to play tennis, or how to swim, or sail a boat, or how to change a tire."

It was in 1914 that Dr. Brown became a staff member of the Presbyterian and of the Children's Hospital. He also taught in the Graduate School of Medicine of the University of Pennsylvania. He published a few papers which he modestly described as being the usual thing. A paper on the "Reduction of Intussusception in Infants" attracted considerable attention. In 1936 he delivered the Annual Oration before the Academy of Surgery on "Acute Hematogenous Osteomyelitis of the Long Bones" which was a controversial subject at that time. His interest in surgery grew and he became an outstanding teacher in his field. He drilled his students on the art of thinking and how to have logic and reasoning behind their statements and conclusions.

* Prepared, and published, at the request of the Council of the College of Physicians of Philadelphia. Read before the College, 4 January 1956.

Henry Brown was a member of the American Medical Association, Philadelphia Academy of Surgery (Recorder 1920–1922, Secretary 1935–1941), a fellow of the College of Physicians of Philadelphia, Eastern Surgical Society, American College of Surgeons, and a member of La Société Internationale de Chirurgie, American Surgical Association, and he was a Diplomate of the American Board of Surgery (Founder's Group).

Dr. Brown served his country in two World Wars. He was instrumental in organizing a hospital unit for the Presbyterian Hospital in the First World War. He served in the 77th Division as a Captain in the Army Medical Corps. He suffered a fractured femur in 1916, an accident which prevented him from going overseas with an ambulance unit of which he was Chief. In the twenties, Dr. Brown's affiliation shifted from the Army Reserve to the Reserve Corps of the Navy, in which he held the rank of Lieutenant Commander. This change was an outgrowth of his interest in yachting. In 1940 and 1941 Dr. Brown aided in organizing a unit at the Pennsylvania Hospital. This unit later became the 52nd Evacuation Hospital. He served with this unit in the Pacific Theater first as Chief of the Surgical Section and later when it had become the 364th Station Hospital as Commanding Officer, returning to the United States as a Colonel in 1946.

In 1947, Dr. Brown retired from his Philadelphia practice and hospital positions and went to China under the auspices of the Episcopal Church to serve in the hospitals of Huitien, Kunming, and Hannau provinces until the area had been overrun by the Communists. After a short sojourn in Philadelphia he travelled west again, this time to Formosa, in a professional capacity, where he remained until 1952.

His interest in his profession never waned and shortly following his return from Formosa, he became active in the Red Cross in the capacity of an advisory physician.

It was in the fall of 1953 he first became aware of the symptoms of his final illness, because of which he entered the University Hospital where he expired on February 19, 1955. An autopsy was performed and the cause of death was established as being Hodgkin's Disease.

All who knew Henry Brown, affectionately nicknamed, by those who served with him in the Pacific during World War II as "Uncle Henry", regarded him with esteem and affection. In him were personified many of the attributes of greatness, but of these the most notable were his outstanding qualifications as a family man, as a teacher, a devoted servant to his profession, and by no means the least was his sacrifice of self in worthy undertakings and his unstinted generosity to those in want. It is not surprising with these qualifications that Dr. Brown was a tower of strength in church work. His Christian devotion was an example to many and it can truly be said he was one of God's own gentlemen.

Memoir of John H. Jopson (1871-1954)*

By GEORGE M. LAWS

DR. JOHN H. JOPSON was born in Philadelphia, Pa. December 28, 1871. He was educated in Philadelphia schools, the School of Biology and the School of Medicine of the University of Pennsylvania where he graduated in the class of 1893. He interned at the Children's Hospital and started practice in Philadelphia where he became Surgeon to the Children's, the Presbyterian and the Bryn Mawr Hospitals.

He taught operative surgery in the School of Medicine and was made Professor of Surgery in the Graduate School of Medicine in 1918, and Emeritus Professor of Surgery in the University of Pennsylvania in 1937 after retiring.

He was a fellow of the Philadelphia Academy of Surgery and its president in 1922 and 1923; a Fellow of the College of Physicians of Philadelphia and of the American College of Surgeons; and a member of the American Surgical Association, the Pathological Society of Philadelphia, the Philadelphia Pediatric Society, the International Surgical Association and the Society of Clinical Surgeons.

He started active military service in 1917 as commanding officer of Unit A, also known as the Presbyterian Hospital Unit, which he organized and took to France. He then became an operating surgeon in Evacuation Hospital No. 1, near Toul, where American surgeons were sent for instruction in war surgery. He later became Chief of Surgical Services with the rank of Lieutenant-Colonel.

Dr. Jopson took a keen interest in many non-professional activities, was well read, and was a gifted speaker ready with apt literary quotations. He could be entertaining and enjoyed association with many friends.

He married Susanna B. Michener in 1909. Mrs. Jopson died before his retirement. After retiring he lived most of the time at Pawley's Island, S. C., near his friend Dr. Henry Norris, and part of the time at Rutherdfordton, N. C. where Dr. Norris and Dr. Montgomery Biggs had built and conducted a successful hospital. In recent years he occasionally flew to Philadelphia to visit his family and friends, particularly those at the University Club. He died December 4, 1954, at Rutherdfordton, N. C. He is survived by his son, Harry, a professor of biology in Bridgewater, Va., and his daughter, Mrs. Blakeley Chandlee of Gladwyne, Pa.

* Prepared, and published, at the request of the Council of the College of Physicians of Philadelphia.

Medical History Essay Contest

The Section on Medical History of the College of Physicians of Philadelphia announces a prize award of $100 for the best essay on the history of medicine submitted by a student of any one of the medical schools of Philadelphia. The subject may be any aspect of medical history or the medical humanities. All essays must be received by the College of Physicians on or before October 1, 1956. The manuscripts must be typewritten, double-spaced, or written in clearly legible hand, on one side of the page, with wide margins. Students who are interested may utilize the resources of the Library of the College of Physicians or any other research or reference material desired.

Mr. Walton B. McDaniel, 2nd, Curator of Library Historical Collections, at the College of Physicians, 19 South 22nd St., Philadelphia 3, Pa., or Fred B. Rogers, M.D., Clerk of the Section on Medical History, School of Medicine, Temple University, Philadelphia 40, Pa., will assist any student in choosing a subject for study, in searching for material, or in preparing the manuscript.

The prize will be awarded at a dinner to which all students submitting an essay will be invited as guests of the Section on Medical History.

The *Transactions & Studies* will have the option of publishing the winning paper and any other entries deemed suitable.

Transactions of the Sections

SECTION ON GENERAL MEDICINE

24 October 1955

The Addition of Thioctic Acid to a Plan for the Management of Hepatic Insufficiency. Charles M. Thompson, M.D., Joseph M. Gambescia, M.D., Phillip Lisan,* M.D., and Morton Fuchs*, M.D. (Discusser: Henry Schwarz*, M.D.) (*Abstract 1, below*)

Cavernous Sinus Thrombosis; a Medico-Surgical Emergency. John H. Arnett, M.D. (Discusser: Henry A. Shenkin*, M.D.) (*Abstract 2, below*)

Multiple Gastric Ulcers: Report of Two Cases, Each with Three Ulcers. Thomas A. Johnson, M.D., and H. R. Hawthorne, M.D. (Discusser: C. W. Wirts, M.D.) (*Abstract 3, below*)

Is Siderosis Harmless? Robert Charr, M.D. (Discusser: Harold L. Israel, M.D.) (*Abstract 4, below*)

28 November 1955

Complications of Nutritional Deficiency in Tuberculosis. J. W. Savacool, M.D. (Discusser: Robert Charr, M.D.) (*Abstract 5, below*)

Ovarian Agenesis. Leonard M. Lister*, M.D. and E. C. Hamblin*, M.D. (Discusser: Karl Paschkis, M.D.) (*Abstract 6, below*)

The Malignant Nature of Sickle Cell Trait. Milton Tellem*, M.D., Albert I. Rubenstone*, M.D., and Abraham M. Frumin*, M.D. (Discusser: Chris J. D. Zarafonetis, M.D.) (*Abstract 7, below*)

Experience with a New Ganglion Blocking Agent, Inversine, in the Management of Severe Grades of Essential Hypertension. Garfield G. Duncan, M.D., Jerome M. Waldron, M.D., William K. Jenson*, M.D., and Richard R. Moyer*, M.D. (Discusser: William Likoff*, M.D.) (*Abstract 8, below*)

* *By invitation.*

SECTION ON MEDICAL HISTORY

22 November 1955

Expanding the Use of the Library's Historical Collections[1]. Walton B. McDaniel, 2nd*, Ph.D.

SECTION ON OPHTHALMOLOGY[2]

20 October 1955

Ocular and Palatal Myoclonus, a Case Report. William McCarty*, M.D., and Nathan Schlezinger, M.D.

Cryoglobulinemia. Richard Ellis*, M.D., and Jeremiah Klotz*, M.D.

The Influence of Chlorpromazine on Intraocular Pressure: Experimental Studies. Satya Dev Paul*, M.D., and Irving H. Leopold, M.D.

17 November 1955

Observations on Ocular Pigment and Pigmentation. Alfred Cowan, M.D. (*Eighteenth Annual de Schweinitz Lecture*)

15 December 1955[3]

(*Eye Section, Philadelphia County Medical Society*)

Management of Penetrating Wounds of the Eye. P. Robb McDonald, M.D.

Concerning Ophthalmic Surgery. Warren S. Reese, M.D.

(*Section on Ophthalmology*)

Excision of Iris Tumor. W. E. Fry, M.D.

Itching of the Eyes; an Inquiry into its Causes. Thomas H. Cowan, M.D.

[1] Published in the *Trans. & Stud.*, February, 1956.

[2] Abstracts of the presentations at this Section customarily appear in the *American Journal of Ophthalmology* and the *A. M. A. Archives of Ophthalmology.*

[3] Joint meeting.

SECTION ON OTOLARYNGOLOGY[4]

16 November 1955

PREVENTION OF POSTOPERATIVE ADENOTONSILLECTOMY BLEEDING WITH VITAMINS K AND C. Herbert P. Harkins, M.D.

TEMPORAL BONE SURGERY IN OTITIS MEDIA AND MASTOIDITIS: Indications, Purposes, and Aims of the Various Operative Procedures. Karl M. Houser, M.D., and Herbert J. Dietrich, Jr.*, M.D.

VALUE OF MASS CALORIC AND TURNING TESTS IN NEUROTOLOGIC DIAGNOSIS OF LABYRINTHINE AND INTRACRANIAL LESIONS. Burech Rachlis*, M.D.

[4] Abstracts of the presentations at this Section customarily appear in the *A. M. A. Archives of Otolaryngology.*

21 December 1955

(Case Reports)

SECRETORY OTITIS MEDIA REQUIRING MASTOIDECTOMY. William J. Hitschler, M.D.

A MALINGERER EXPOSED. Douglas Macfarlan, M.D.

MUCOCELE OF FRONTAL SINUS—TRAUMATIC RUPTURE. I. Richard Adelizzi*, M.D.

COMA OF MULTIPLE ORIGIN, INCLUDING BRAIN ABSCESS. Allan R. Shuster*, M.D.

ABSTRACTS

Abstract 1

THE ADDITION OF THIOCTIC ACID TO A PLAN FOR THE MANAGEMENT OF HEPATIC INSUFFICIENCY. Charles M. Thompson, M.D., Joseph M. Gambescia, M.D., Philip Lisan, M.D. and Morton Fuchs, M.D.

In hepatic coma elevated blood ammonia levels have been repeatedly observed. High blood and spinal fluid levels of glutamine, methionine sulfoxide and amino aciduria indirectly suggest a marked alteration in the metabolism of nitrogenous compounds.

There is also evidence of an interruption in intermediate carbohydrate metabolism. This is indicated by elevations of blood lactic acid, pyruvic acid and alpha-ketoglutaric acid. It could be postulated that failure of an enzyme system or systems could account for the elevated blood levels of these metabolites.

The failure of an enzyme system to facilitate the aerobic oxidative decarboxylation of alpha-keto acids and the transference of decarboxylated pyruvic acid into the Kreb cycle could be one result of hepatic insufficiency.

Thioctic acid (lipoic acid, pyruvate oxidation factor, protogen, etc.) is one of the more recently recognized biocatalysts. This factor has now been synthetized in the pure form. The nutritionally effective form of thioctic acid is a complex of thioctic acid and thiamin. This molecular conjugate appears to have an essential role in the oxidation of alpha-keto acids and in the transference of pyruvic acid into the Kreb cycle.

First, a group of patients without evidence of hepatic disease were studied and diurnal variations in the blood pyruvic acid and lactic acid levels in relationship to time of day, diet or exercise were recorded.

There was no effect of thioctic acid on normal blood pyruvic and lactic acid levels.

A group of patients with evidence of hepatic insufficiency marked by torpor or coma and normal or elevated blood pyruvic acid and lactic acid levels were then followed with the institution of an aggressive plan for their management. There was no change in the level of blood metabolites in the majority of these cases.

With these backgrounds a group of patients with gross evidence of hepatic insufficiency and coma were followed after the institution of the hepatic regimen with the addition of intramuscular thioctic acid. In the majority of these there was a decrease in the elevations and decrease most often coincided with improvement in sensorium.

It is suggested that thioctic acid be added to the usual aggressive plan for the management of hepatic insufficiency and that further studies

be planned to determine its essential role in the utilization of alpha-keto acids.

Abstract 2

CAVERNOUS SINUS THROMBOSIS; A MEDICO-SURGICAL EMERGENCY. John H. Arnett, M.D.

A case of cavernous sinus thrombosis in a 20 year old male is reported. The illness started with coryza, a progressively severe headache, and a small pustule on the left cheek close to the nose. In spite of the administration of penicillin at the onset of the illness when the temperature was normal, the patient developed a fever, chemosis and proptosis at first of the left and later of both eyes. Following his admission to the hospital, the patient vomited repeatedly and complained of severe pain in the left ear, face and postorbital region. Examination revealed congestion of the fundal vessels, proptosis of the left eye and paralysis of the left eye ball. The Kernig reflex was positive and the neck was rigid. The nasal septum was deviated markedly to the left and a muco-purulent secretion was covering the nasal mucosa. From this secretion staphylococci and streptococci were cultured. Lumbar puncture revealed fluid under increased pressure and containing increased numbers of white and red blood cells but no bacteria were demonstrable. X-ray examination revealed clouding of the left ethmoid sinus. Energetic treatment with sulfadiazine, crystalline penicillin and streptomycin, followed later by aureomycin and cortisone, resulted in eventual recovery and disappearance of abducens paralysis. The diagnosis and treatment of cavernous sinus thrombosis are discussed.

Abstract 3

MULTIPLE GASTRIC ULCERS: REPORT OF TWO CASES, EACH WITH THREE ULCERS. Thomas A. Johnson, M.D., and Herbert R. Hawthorne, M.D.

Pre-operative roentgen demonstration of three distinct, chronic benign gastric ulcers occurring simultaneously is rare. We report two such cases.

Case I. 45-year-old white female. Severe epigastric pain for one year. Relief of pain by use of alcoholic beverages. No night pain, back reference or hemorrhage. Pre-operative gastric analysis showed peak free hydrochloric acid value of 37 clinical units. Roentgen study demonstrated three gastric ulcers, confirmed at surgery. Subtotal gastrectomy successfully controlled symptoms.

Case II. 45-year-old white female. Epigastric pain of two months' duration with relief by ingestion of food or alcohol. No vomiting or hemorrhage. Pre-operative gastric analysis showed peak free hydrochloric acid value of 34 clinical units. Roentgen study demonstrated three gastric ulcers along the greater curvature, confirmed at surgery. Relief with subtotal gastrectomy.

Abstract 4

IS SIDEROSIS HARMLESS? Robert Charr, M.D.

Siderosis of the lungs, such as is seen following the inhalation of welding fumes, is generally regarded as a harmless condition. Occasionally, however, patients are encountered with respiratory difficulties and a history of prolonged exposure to welding fumes presumably containing finely divided particles of iron oxide. Three patients are reported, in addition to those reported earlier, manifesting dyspnea and cough. All three had been exposed for many years to welding fumes. The roentgenograms of their chests were similar to those seen in silicosis. Pulmonary function tests demonstrated varying degrees of impaired function. In two patients it was possible to obtain pulmonary biopsies. In one patient numerous iron particles were demonstrated in addition to cellular infiltration and fibrosis of the perivascular spaces. The biopsy of the other patient revealed the picture of chronic pneumonitis with granulomatosis and angiitis.

The inhalation of iron oxide dust by experimental animals has been shown to result in the production of identical roentgenologic lung shadows as seen in patients, but the examination of tissues showed no evidence of fibrosis.

Although it is impossible to exclude the in-

halation of other noxious agents in the reported patients, it would seem correct to regard siderosis in rare instances as being capable of bringing about considerable respiratory disturbances. Inhalation of vaporized bronchodilator drugs produced symptomatic relief.

Abstract 5

COMPLICATIONS OF NUTRITIONAL DEFICIENCY IN TUBERCULOSIS. J. W. Savacool, M.D.

A series of patients with gastro-intestinal disease constitutes the major part of this presentation. Three patients with tuberculosis following gastrectomy and one with gastritis and hemorrhage all showed a similar type of acute progressive pulmonary tuberculosis. A common factor in these patients was failure to gain weight because of inability to eat. The tuberculosis was of the caseous pneumonic type in all patients and there was a tendency of the lesions to coalesce. In one the nutritional needs could be met for a time after gastrectomy but when tuberculous laryngitis supervened rapid pneumonic extension occurred even while the patient was receiving anti-microbial treatment. In another patient, response to anti-microbial treatment was satisfactory for a time after it was begun but the patient succumbed to a hepatic malignancy. In the other two the course was progressively downhill. All patients died.

All four patients have been observed during the anti-microbial era and all had at least some treatment with anti-microbial agents.

Results of treatment for tuberculous empyema are also probably related to nutritional factors. A recent patient with clubbed fingers from tuberculous empyema was unable to show progress in spite of apparently successful surgical drainage until the nutrition could be improved. Several patients with pleural complications of surgery have shown a similar failure of improvement until weight gain and adequate nutrition could be achieved. In some of these the deficiency results from the effects of the tuberculosis itself; in others undetermined factors, probably relating to nutrition and metabolism, appear to play a part.

The integrity of gastric secretory processes may be one of the essential factors in the proper digestion and assimilation of nutrients but we have at present no way of evaluating this objectively. Multiplicity of stresses may also play a part. Vitamin needs are also a possible factor, the work of Getz having recently drawn attention to this matter once more. His findings suggest that natural Vitamin A is more beneficial in treatment than synthetic Vitamin A.

It is concluded that special precautions should be taken in the treatment of patients with nutritional deficiencies and where tuberculosis constitutes a threat, conservatism should guide the management of other diseases. It would be well to survey the chest prior to surgery in all patients in whom gastrectomy is planned. In duodenal ulcer, the threat of reactivating known tuberculosis may constitute a relative contraindication to surgery. When urgent, surgery may be made safer by judicious use of antimicrobial agents. It is also suggested that patients who fail to do well or who have such complications as tuberculous laryngitis, gastro-intestinal tuberculosis, pleural complications or any process which appears to interfere with adequate nourishment be considered from the standpoint of nutrition and metabolism. Prior to the anti-microbial era, these matters were highly regarded. They should not be lost sight of now.

Abstract 6

OVARIAN AGENESIS. L. M. Lister, M.D., and E. C. Hamblin, M.D.

A syndrome of sexually infantile female dwarfs with pterygium coli and cubitus valgus was first described by Turner in 1938. Varney later demonstrated high urinary gonadotrophin levels in these patients implicating a primary gonadal defect. Later experimental studies of others demonstrated that the removal of rudimentary testicles, but not ovaries, in fetal rabbits produced similar malformations. Recent studies by Wilkins revealed that the large majority of patients with the syndrome which he terms "gonadal dysgenesis" manifest a male sex chromosomal pattern. The authors present

13 patients in whom skin biopsies were obtained for chromosomal study. Eight patients, in whom a reliable study was made, showed the male chromosomal pattern. Other congenital anomalies were also seen frequently in the patients reported here and by other authors.

Some patients with the above syndrome manifest certain male characteristics and the question has been raised whether a male counterpart exists. Patients reported to fall into that category have not shown a uniform clinical or endocrine picture and the authors recommend that a male counterpart should be ignored. Because of the confusing terminology applied to the syndrome and because of the outstanding contributions made to the understanding of its pathogenesis by Wilkins, the authors suggest that the syndrome carry the name of Dr. Wilkins.

Abstract 7

THE MALIGNANT NATURE OF SICKLE CELL TRAIT. Milton Tellem, M.D., Albert I. Rubenstone, M.D., and Abraham M. Frumin, M.D.

Since 1941, several authors have noted the rare, but occasional patient with sickle cell trait apparently succumbing to their so called benign, hematologic disorder. We wish to take this opportunity to report such a patient and to re-emphasize the occasionally occurring malignant nature of sickle cell trait.

The case herein reported is a thirty-six year old normotensive male who experienced an episode of generalized joint pains, a seizure simulating an acute myocardial infarction, and in his last admission, died in uremia. The patient was never known to be anemic, gave a positive sickling test, and presented normal values for red blood count and hemoglobin prior to death. An elevated bilirubin and nucleated red blood cells in the peripheral blood were noted during the ninety-six hours prior to death along with deepening scleral icterus. X-ray findings compatible with sickle cell anemia were noted in the ribs, pelvic bones, and vertebrae. At autopsy focal siderofibrosis of an 80 gm. spleen was found, with generalized congestion of all organs with sickle cells. Aside from focal, chronic pyelonephritis, the profound glomerular occlusion by sickle cells was the main apparent morphologic change accounting for the uremic state. Our patient therefore exhibited clinical, hematologic, roentgenologic and autopsy findings usually associated with a patient having sickle cell anemia. The process was apparently of a chronic and intermittent nature. An electrophoresis of hemoglobin was unfortunately not done. However in three previous similar reported cases the pattern of the trait was obtained.

A discussion of the various important features of this case along with a review of the literature is presented in the main body of this report. The importance of considering sickle cell trait per se as a cause of renal failure is stressed.

Abstract 8

EXPERIENCE WITH A NEW GANGLION BLOCKING AGENT, INVERSINE, IN THE MANAGEMENT OF SEVERE GRADES OF ESSENTIAL HYPERTENSION. Garfield G. Duncan, M.D., Jerome M. Waldron, M.D., William K. Jenson, M.D., and Richard R. Moyer, M.D.

Inversine, an autonomic ganglion blocking agent, is a secondary amine in distinction from the quaternary methonium compounds, hexamethonium and pentolinium. It is totally and rapidly absorbed in the upper part of the gastrointestinal tract and its degree or rate of absorption is not altered by either constipation or diarrhea.

Experience with Inversine in the treatment of 27 patients having severe grades of essential hypertension, three being in the malignant phase, shows it to be an effective agent in reducing the blood pressure to innocent levels with resulting decrease in the size of the heart and in the regression of retinal changes. Subjective improvement paralleled the improved status of the blood pressure.

Occasional slight tolerance to the drug was noted, but more often a decreased need followed its continued use. A slight cumulative

effect was apparent in some cases. Doses as small as 2 mg. at 8-hour intervals were satisfactorily effective. Others were as high as 7.5 mg. at 8-hour intervals. The average falls between 10 and 25 mg. for the total daily dose.

We have had several patients with severe grades of hypertension whose pressures were not favorably affected by more conservative measures until after correction with Inversine which was later withdrawn without subsequent return of the hypertension while previously unsuccessful measures were employed.

Constipation was the most prominent and refractory side effect. Withdrawal of the drug was necessary in only two cases and this was because of constipation and abdominal pain. Other, but minor, side effects were: dizziness, dimness of vision, dryness of the mouth and throat, disturbances in seminal ejaculation, and retarding of the urinary flow on the first voiding in the morning. All but the disturbance in seminal ejaculation tend to subside with continued use of the drug.

The aim in therapy is to maintain the systolic pressure between 110 and 130 mm. Hg in the standing position.

Barring severe renal failure, Inversine is an effective agent in the control of those severe grades of essential hypertension which are not controllable by more conservative measures.

Public Lectures

I—Juvenile Delinquency. 26 September 1955.

Psychiatric Aspects of Delinquent Behavior. Norman Nixon, M.D.

Prevention and Control of Juvenile Delinquency. J. O. Reinemann, LL.D.

Community Treatment Project at Highfields. Lloyd W. McCorkle, Ph.D.

Moderator: Edward A. Strecker, M.D.

II—Our Aging Population. 3 October 1955.

Population Profiles, Ancient and Modern. J. Lawrence Angel, Ph.D.

Basic Medical Needs. Thomas M. Durant, M.D.

Adult Education. Robert L. Johnson, LL.D., L.H.D.

Insurance Services. Hon. John A. Diemand.

Moderator: Edward L. Bortz, M.D.

III—Homosexuality and Sexual Deviants. 10 October 1955.

Psychodynamics of Homosexuality. Philip Q. Roche, M.D.

Endocrinological Aspects of Homosexuality. Abraham E. Rakoff, M.D.

Legal Aspects of Homosexuality. Michael von Moschzisker, Esq.

Trends in Treatment. Samuel B. Hadden, M.D.

Moderator: Calvin S. Drayer, M.D.

List of College Lectures, 1955

5 January 1955

Glass, Albert M. Combat Psychiatry and its Application to Civilian Medical Practice. (James M. Anders Lecture XXXIII; *Transactions & Studies*, June, 1955)

2 February 1955

Salk, Jonas E. Recent Studies on Immunization Against Poliomyelitis. (Mary Scott Newbold Lecture LXX)

2 March 1955

Farber, Sidney. Approaches to the Chemotherapy of Cancer. (Nathan Lewis Hatfield Lecture XXXIX; *Transactions & Studies*, August, 1955)

6 April 1955

Brown, Robert Bruce. Transplantation of Tissues. (Mary Scott Newbold Lecture LXXI; *Transactions & Studies*, August, 1955)

*11 May 1955**

The Management of Rheumatoid Arthritis.

Lansbury, John. The Importance of the Basic Program, Physical Therapy, Salicylates, and Gold Salts.

Freyberg, Richard H. Treatment with Butazolidin, Cortisone, ACTH, and Hydrocortisone.

Bunim, Joseph J. Treatment with Meticorten, Other New Steroids; and Things to Come in Arthritis Treatment.

Moderator: Joseph Lee Hollander.

5 October 1955

O'Brien, Frank J. The Utilization of Psychiatric Services in the Schools. (James M. Anders Lecture XXXV†; *Transactions & Studies*, February, 1956)

*2 November 1955**

Rammelkamp, Charles H. Streptococcal Infection in Relation to Rheumatic Fever and Nephritis. (Alvarenga Prize Lecture XV; *Transactions & Studies*, February, 1956)

7 December 1955

Tocantins, Leandro M. Platelets, Hemorrhage and Thrombosis. (Thomas Dent Mütter Lecture LXVIII)

* Joint Meeting with the Philadelphia County Medical Society.

† Previously unnumbered Anders Lecture in 1935 now included.

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W. B. MCDANIEL, 2d

Editor, Transactions & Studies

WILLIAM K. BEATTY

Curator, Mütter Museum; Custodian, College Collections

ELLA N. WADE

Superintendent

GEORGE S. ALLEN

Fellows

December 31, 1955

ELECTED

1952. Abelson, Neva Martin, 32 Woodale Rd.
1926. Adler, Francis Heed, 313 S. 17th St.
1949. Aegerter, Ernest E., 3400 N. Broad St.
1953. Agerty, Horst A., 1111 N. 63rd St. (31)
1914. Aiken, Thomas G., Berwyn, Pa.
1936. Alexander, Fay Knight, Germantown Professional Bldg., Greene and Coulter Sts.
1932. Allen, Frederick H., 1711 Fitzwater St.
1953. Allman, David B., 104 St. Charles Pl., Atlantic City, N. J.
1935. Alpers, Bernard J., 111 North 49th St.
1930. Appel, Kenneth E., 111 N. 49th St.
1905. Appleman, Leighton Francis, 308 S. 16th St.
1935. Armitage, George L., 400 E. 13th St., Chester, Pa.
1922. Arnett, John H., 2116 Pine St.
1942. Aronson, Joseph D., Henry Phipps Institute, 7th and Lombard Sts.
1952. Ash, Rachel, 5636 Pine St. (43)
1952. Aston, Melville J., 2507 S. 21st St.
1944. Atkins, Joseph P., 1201 Knox Rd., Wynnewood, Pa.
1935. Atlee, John L., Jr., 37 E. Orange St., Lancaster, Pa.
1952. Atlee, William A., 37 E. Orange St., Lancaster, Pa.
1954. Austin, George M., 3400 Spruce St. (4)
1935. Bach, Theodore F., 1900 Rittenhouse Sq.
1942. Bachman, Carl, Univ. of Pa. Hospital.
1937. Bacon, Emily P., Lankenau Medical Bldg., (31)
1952. Baier, Howard N., 3401 N. Broad St.
1952. Baker, Howard W., 3401 N. Broad St.
1946. Baker, Walter W., 255 S. 17th St.
1940. Barba, Philip S., 5919 Greene St.
1943. Barden, Robert P., 8835 Germantown Ave.
1911. Barnard, Everett P., 1820 Rittenhouse Sq.
1939. Barnshaw, Harold D., 406 Cooper St., Camden, N. J.
1939. Bartle, Harvey, Jr., 133 S. 36th St.
1931. Bates, William, 2029 Pine St.
1932. Batson, Oscar V., 3502 Hamilton St.
1921. Bauer, Edward L., 5501 Greene St. (44)
1933. Bauer, John T., 312 E. Second St., Moorestown, N. J.
1939. Baumann, Frieda, 1914 Panama St.
1908. Beardsley, E. J. G., 1919 Spruce St.
1930. Beardwood, Joseph T., Jr., 2031 Locust St.
1955. Beckfield, William J., Graduate Hospital (46)
1952. Bedrossian, E. Howard, 2027 Spruce St.
1949. Beecham, Clayton T., Greene & Coulter Sts.
1935. Beerman, Herman, 255 S. 17th St. (3)
1942. Behrend, Albert, 255 S. 17th St.
1945. Behrend, Bernard, 5910 Greene St.
1934. Behrend, Moses, 255 S. 17th St.
1949. Beizer, Lawrence H., 255 S. 17th St.

1930. Belk, William Parks, 433 Owen Rd., Wynnewood, Pa.
1936. Bell, Benjamin Tertius, Abington Medical Bldg., Keith & York Rds., Abington, Pa.
1947. Bellet, Samuel, 2021 Spruce St.
1954. Bello, Carmen T., 3401 N. Broad St. (40)
1952. Bennett, George A., 1025 Walnut St.
1941. Bernstein, Mitchell, 7609 Mountain Ave. (17)
1951. Bernstine, J. Bernard, 255 S. 17th St.
1937. Bertolet, J. Allen, 4024 Timber Lane.
1918. Billings, Arthur E., 2020 Spruce St.
1952. Bird, Gustavus C., Jr., 3401 N. Broad St.
1949. Bishop, Edward H., 811 Spruce St. (7)
1933. Bishop, Paul A., Pennsylvania Hospital.
1944. Blady, John V., 340 Fishers Rd., Bryn Mawr, Pa.
1952. Blake, Paul O., 273 N. Lansdowne Ave., Lansdowne, Pa.
1951. Blank, Harvey, Squibb Institute, Georges Rd., New Brunswick, N. J.
1917. Block, Frank B., 305 Tabor Medical Bldg., York & Tabor Rds.
1949. Blumstein, George I., 2039 Delancey St.
1929. Bockus, Henry L., 250 S. 18th St.
1928. Boles, Russell S., Rittenhouse Plaza, 1901 Walnut St.
1923. Bond, Earl D., 111 N. 49th St.
1911. Bonney, Charles W., 255 S. 17th St.
1948. Bookhammer, Robert S., 209 Rittenhouse Claridge. (3)
1931. Bortz, Edward Le Roy, 2021 W. Girard Ave.
1921. Borzell, Francis Frank, 4940 Penn St.
1936. Bostwick, Delazon Swift, 106 Linwood Ave., Ardmore, Pa.
1928. Bothe, Frederick A., 255 S. 17th St.
1951. Boucot, Katharine R., 229 W. Upsal St.
1947. Bourland, Henry S., 2219 Garret Rd., Drexel Hill, Pa.
1923. Bower, John O., 2008 Walnut St.
1954. Bowers, Paul A., 2035 Locust St. (3)
1942. Bowie, Morris A., Bryn Mawr Medical Bldg., Bryn Mawr, Pa.
1907. Bradley, William Nathaniel, Hotel Belgravia, 1811 Chestnut St. (3)
1954. Bralow, S. Philip, 2104 Delancey Pl. (3)
1942. Branen, William, Whitby & Cypress Ave., Yeadon, Pa.
1921. Bransfield, John W., 2101 Spruce St.
1948. Braun, William, 406 Cooper St., Camden, N. J.
1953. Brav, Solomon S., 5575 N. Park Ave. (41)
1953. Breckenridge, Robert L., 475 Plymouth Rd., Glenside, Pa.
1951. Brinton, S. Jervis, Fishers Road, Bryn Mawr, Pa.
1946. Briscoe, Clarence Conway, 811 Spruce St. (7)
1953. Brobeck, John R., Univ. of Pa. School of Medicine. (4)
1952. Brody, Morris W., 1930 Chestnut St.
1948. Brogan, Edmund J., Thomas Wynne Apartment, Wynnewood, Pa.
1917. Bromer, Ralph S., 723 Woodfield Rd., Villa Nova, Pa.
1953. Brooke, John A., 1431 Spruce St. (2)
1936. Brown, Clark E., Lankenau Hospital.
1932. Brown, Claude P., 1930 Chestnut St.
1939. Brust, Raymond W., 4710 Chester Ave.
1953. Bucher, Robert M., 3401 N. Broad St. (40)
1952. Bumgardner, Heath D., 3701 N. Broad St.
1953. Burbidge, J. Raymond, 163 Nassau St., Princeton, N. J.
1940. Burnett, W. Emory, 3401 N. Broad St.

1954. Burros, Harry M., 255 S. 17th St. (3)
1941. Butler, Miriam, Watersmeet, Glen Mills, Pa.
1907. Cadwalader, Williams B., 133 S. 36th St.
1928. Campbell, Edward H., 133 S. 36th St.
1952. Campbell, Edward W., 1318 Medical Arts Bldg.
1944. Campion, Richard J., Penllyn Rd., Springhouse, Ambler, Pa.
1931. Cantarow, Abraham, 1025 Walnut St.
1952. Cardone, John B., 831 N. 63rd St.
1935. Carey, Lawrence S., 330 S. 9th St.
1931. Cariss, Walter L., 4310 Walnut St.
1930. Carpenter, Chapin, 1930 Chestnut St.
1917. Carson, John B., Newtown Square, Pa.
1937. Castallo, Mario A., 1621 Spruce St.
1943. Castigliano, S. Gordon, 853 Mt. Pleasant Rd., Bryn Mawr, Pa.
1949. Caswell, H. Taylor, 3401 N. Broad St.
1954. Catenacci, Alfred J., 1417 S. Broad St. (47)
1954. Cathcart, Richard T., 739 S. Broad St. (47)
1950. Chamberlain, Richard H., 3400 Spruce St.
1933. Chamberlain, W. Edward, Temple University Hospital.
1939. Chamberlin, George W., Reading Hospital, Reading, Pa.
1900. Chance, Burton, 317 S. 15th St.
1945. Chance, Burton, Jr., 1726 Spruce St.
1950. Chapple, Charles C., Flourtown, Pa.
1954. Charny, Charles W., 2039 Delancey Pl. (3)
1939. Charr, Robert Kyun Hyun, 2038 Locust St.
1947. Chouké, Kehar S., P.O. Box 547, Kecoughton, Va.
1945. Cianfrani, Theodore, 1930 Chestnut St.
1939. Ciccone, Emmet F., 2021 Murray St.
1951. Clagett, Augustus H., Jr., 303 Lighthouse Rd., Wilmington 3, Del.
1929. Clark, Eliot R., 315 S. 41st St.
1934. Clark, Jefferson Hamer, 101 Maple Ave., Wyncote, Pa.
1951. Clark, John K., University Hospital, 36th & Spruce Sts.
1947. Clark, Thomas Williams, 400 E. Willow Grove Ave.
1947. Classen, Charles H., Cushman Rd. and Lancaster Ave., Rosemont, Pa.
1910. Cloud, J. Howard, 111 St. Pauls Road, Ardmore, Pa.
1903. Coates, George Morrison, 1721 Pine St.
1941. Cohen, J. Gershon, 255 S. 17th St.
1951. Cohen, Leon Solis-, 1422 Chestnut St.
1949. Cohen, Louis B., 1320 Arrott St.
1907. Cohen, Myer Solis-, 2110 Spruce St.
1953. Cohen, Robert V., 255 S. 17th St. (3)
1955. Colcher, Abraham E., 269 S. 19th St. (3)
1934. Colgan, Robert C., % Abrams, RD #1, Bridgeport, Pa.
1934. Collins, Leon Howard, Jr., 133 S. 36th St.
1943. Colonna, Paul C., Univ. of Pa. Hospital.
1949. Conger, Kyril B., 3401 N. Broad St.
1945. Coonel, Pauline, 47 E. Mt. Pleasant Ave.
1930. Cooper, David A., 1520 Spruce St.
1953. Cooper, Donald R., 133 S. 36th St. (4)
1947. Coppolino, John F., 1807 S. Broad St.
1952. Corbit, John D., Jr., 3717 Chestnut St.
1941. Cornelius, Chalmers E., 119 Summit Ave., Jenkintown, Pa.

1911. Cornell, Walter S., Board of Public Education, Parkway and 21st St.
1945. Corrigan, Patrick H., 1720 S. Broad St., Trenton, N. J.
1914. Corson, Edward F., 136 S. 16th St.
1946. Costello, Thomas J., 131 Pennsylvania Avenue, Bryn Mawr, Pa.
1924. Cowan, Alfred, 1930 Chestnut St.
1940. Cowan, Thomas H., 1930 Chestnut St.
1904. Craig, Frank A., 429 Montgomery Ave., Haverford, Pa.
1907. Crampton, George S., 2031 Locust St.
1947. Crane, A. Reynolds, 807 Spruce St.
1937. Crane, Martin P., 2412 N. Broad St.
1920. Creighton, William J., 37 S. 20th St.
1952. Crellin, J. Antrim, 1930 Chestnut St.
1941. Creskoff, Adolph J., 3400 Spruce St.
1955. Crist, Walter A., 211 N. 5th St., Camden, N. J.
1921. Crossan, Edward T., R. D. #1, Conshohocken, Pa.
1904. Cruice, John M., 407 S. 22nd St.
1937. Crump, Jean, 1914 Panama St.
1937. Curtis, Lawrence, 535 Cornell Ave., Swarthmore, Pa.
1934. Custer, R. Philip, 126 Grays La., Haverford, Pa.
1938. Dannenberg, Arthur M., 235 S. 15th St.
1951. Daugherty, Earl A., 2025 W. Girard Ave.
1953. Davie, John H., 269 S. 19th St. (3)
1947. Davis, C. Nelson, 133 South 36th St.
1936. Davis, David M., 255 S. 17th St.
1951. Davis, J. Wallace, 135 S. 18th St.
1937. Davis, Perk Lee, P.O. Box 701, Paoli, Pa.
1935. Deaver, J. Montgomery, Lankenau Medical Bldg., (31)
1947. Dehne, Theodore L., Adams Avenue and Roosevelt Blvd.
1935. Deibert, Irvin Elmer, 538 Cooper St., Camden, N. J.
1954. Deitrick, John E., 1025 Walnut St. (7)
1923. De Long, Perce, 37 S. 20th St.
1955. De Long, Samuel L., 37 S. 20th St. (3)
1952. DeLuca, Charles Q., 255 S. 17th St.
1952. De Orsay, Ralph H., 1241 Lindale Ave., Drexel Hill, Pa.
1951. De Palma, Anthony F., 248 S. 21st St.
1928. Dewees, A. Lovett, Glen Mills, Del. Co., Pa.
1952. Digilio, Victor A., 2200 St. James Place.
1924. Dillon, Edward S., Conshohocken State Rd., Penn Valley, Narberth, Pa.
1953. Dixon, James P., Dept. of Public Health, City Hall Annex. (7)
1920. Doane, Joseph C., 617 W. Hortter St.
1948. Dohan, Francis Curtis, 80 Princeton Road, Cynwyd, Pa.
1954. Donaldson, James B., 235 N. Broad St. (2)
1946. Donnelly, Andrew J., 33rd and Powelton Ave.
1942. Donnelly, Edward J., 1321 Spruce St.
1933. Donnelly, Joseph C., 6832 Ogontz Ave.
1937. Donnelly, Robert T. M., 255 S. 17th St.
1954. Downing, Daniel F., 8864 Norwood Ave., (18)
1952. Drayer, Calvin S., 111 N. 49th St.
1949. Dripps, Robert D., 3400 Spruce St.
1935. Duane, William, Jr., 2109 Spruce St. (3)
1944. Dublin, George J., 1930 Chestnut St.
1944. Dugger, John H., 3902 Vaux St.

1935. Duncan, Garfield G., 330 S. 9th St.
1937. Dunn, Charles W., 265 S. 19th St.
1951. Dunne, Francis S., 133 S. 36th St.
1953. Dupler, Donald A., 4028 Walnut St. (4)
1942. Durant, Thomas M., 3401 N. Broad St.
1947. Durkin, John Keenan, 34 W. Montgomery Ave., Ardmore, Pa.
1942. Dyer, W. Wallace, Bryn Mawr Medical Bldg., Bryn Mawr, Pa.
1935. Eads, John T., 2029 Delancey St.
1936. Easby, Mary Hoskins, Woman's Hospital.
1948. Eaton, Francis H., 4007 Chestnut St.
1953. Eberhard, Theodore P., Jefferson Hospital. (7)
1937. Edeiken, Joseph, 2130 Delancey Pl.
1955. Edwards, Margaret Hay, 224 W. State St., Trenton, N. J.
1944. Eger, Sherman A., 2029 Delancey St.
1949. Egoville, John W., 720 N. 63rd St.
1944. Ehrich, William E., 540 W. Hortter St.
1953. Eisenberg, Isadore J., 1520 N. 2d St., Harrisburg, Pa.
1946. Elfman, Louis Kenneth, 6330 Lebanon Avenue.
1949. Elkinton, J. Russell, Oak Lane, Moylan, Pa.
1955. Ellis, Samuel, 541 S. 46th St., (43)
1939. Ellis, Van Mashburn, 1528 Spruce St. (2)
1928. Ellison, Richard T., 8601 Stenton Ave.
1936. Ellson, J. Vernon, 807 Spruce St.
1904. Elmer, Walter G., 1801 Pine St.
1937. Elsom, Kendall A., Maloney Clinic Bldg., 36th & Spruce St. (4)
1934. Ely, William C., 3912 Chestnut St.
1932. Engel, Gilson C., Lankenau Medical Bldg. (31)
1945. English, O. Spurgeon, 3401 N. Broad St.
1942. Erb, William H., 133 S. 36th St.
1953. Erf, Lowell A., Jefferson Hospital. (7)
1950. Ersner, Matthew S., 1915 Spruce St.
1954. Evans, Harry D., Jr., 250 S. 18th St. (3)
1954. Evans, William W., Bryn Mawr Medical Bldg., Bryn Mawr, Pa.
1948. Everts, Glenn S., 5515 Wissahickon Ave., Apt. D-403.
1955. Eynon, Harold K., 538 Cooper St., Camden, N. J.
1946. Farell, David M., 1912 Spruce St.
1903. Farr, Clifford B., Bryn Mawr, Pa.
1945. Farrar, George Elbert, Jr., 528 Scott Rd., Gladwyne, Pa.
1953. Farrell, Harry L., 1930 Chestnut St. (3)
1930. Farrell, John T., Jr., 255 S. 17th St.
1935. Ferguson, Lewis Kraeer, 133 S. 36th St.
1936. Fetter, Ferdinand, 322 S. 21st St.
1945. Fetter, John S., 842 Worrell Rd., Jenkintown, Pa.
1935. Fetter, Theodore R., 255 S. 17th St.
1924. Fewell, Alexander G., 1924 Pine St.
1952. Fields, Harry, 133 S. 36th St.
1955. Finestone, Albert J., 2039 Pine St., (3)
1943. Finkelstein, Arthur, 480 Latch's Lane, Merion, Pa.
1955. Finkelstein, David, 1930 Chestnut St., (3)
1955. Finley, John K., 527 Welsh St., Chester, Pa.
1954. Finn, Joseph L., 7109 Rising Sun Ave. (11)
1947. First, Arthur, 1714 Spruce St.

1954. Fischer, Carl C., Germantown Professional Bldg. (44)
1945. Fiske, Frederick A., 1530 Locust St.
1952. Fitts, William T., Jr., 3400 Spruce St.
1928. Fitz-Hugh, Thomas, Jr., 2016 Delancey Pl.
1952. Flexner, Louis B., Univ. of Pa.
1928. Flick, John B., 819 Black Rock Rd., Gladwyne, Pa.
1954. Flick, John B., Jr., Bryn Mawr Medical Bldg., Bryn Mawr, Pa.
1952. Flinn, Lewis B., 503 Delaware Ave., Wilmington, Del.
1939. Flippin, Harrison F., 255 S. 17th St.
1951. Ford, Elbert S. C., 255 S. 17th St.
1954. Forster, H. Walter, Jr., 37 S. 20th St. (3)
1941. Fox, C. Calvin, 1806 Spruce St.
1906. Fraley, Frederick, 71st and City line.
1955. Frayer, William C., 313 S. 17th St. (3)
1941. Frazier, William Doane, 419 Gilpin Rd., Narberth, Pa.
1952. Freed, Herbert, 255 S. 17th St.
1953. Fried, Paul H., 1812 Spruce St. (3)
1955. Friedenberg, Zachary B., 133 S. 36th St. (4)
1951. Friedland, Carl K., 133 S. 36th St.
1951. Friedman, Paul Sigmund, 1422 Chestnut St.
1942. Friedman, Reuben, 1321 Spruce St.
1933. Fritch, James Scott, 269 S. 19th St.
1937. Fritz, Herbert H., Pennswood Rd., Bryn Mawr, Pa.
1953. Fruchter, Joseph M., 2104 Pine St. (3)
1940. Fry, Kenneth E., 1719 Rittenhouse Sq.
1935. Fry, Wilfred Eyles, 1930 Chestnut St.
1937. Furlong, Thomas F., Jr., Times Medical Building, Ardmore, Pa.
1954. Gambescia, Joseph M., 255 S. 17th St. (3)
1935. Gammon, Geo. D., Univ. of Pa. Hospital.
1951. Garlichs, Richard W., 216 N. Manoa Road, Havertown, Pa.
1931. Garner, Vaughn C., Germantown Professional Building.
1953. Garnet, James D., 330 S. 9th St. (7)
1950. Garvin, Eugene J., 4219 Baltimore Ave.
1953. Geckeler, Edwin O., 269 S. 19th St. (3)
1952. Gefter, William I., 366 Penn Rd., Wynnewood, Pa.
1935. Geist, Donald C., 1930 Chestnut St.
1955. Gelfand, David, 1722 Pine St., (3)
1954. German, George B., 429 Cooper St., Camden, N. J.
1955. Gettes, Bernard C., 1930 Chestnut St. (3)
1899. Gibbon, John H., Media, Pa.
1934. Gibbon, John H., Jr., 1025 Walnut St.
1939. Gibson, Glen Gregory, 2031 Locust St.
1944. Gifford, Edward S., Jr., 1913 Spruce St.
1954. Gilbert, Philip D., Cooper Hospital, Camden, N. J.
1954. Giletto, Basil J., 2020 Locust St. (3)
1920. Gill, A. Bruce, 1930 Chestnut St.
1927. Gilmour, William R., 6616 Woodland Ave. (42)
1952. Gilpin, Sherman F., 3701 N. Broad St.
1949. Ginsburg, Isadore W., 3401 N. Broad St.
1931. Giordano, Anthony A. S., 1819 S. Broad St.
1954. Gislason, Gerhard J., Medical Arts Bldg. (2)
1954. Glover, Robert P., 269 S. 19th St. (3)

1953. Godfrey, Lincoln, 255 S. 17th St. (3)
1945. Goldberg, Samuel J., 1723 Pine St.
1933. Goldburgh, Harold L., 1932 Spruce St.
1935. Goldsmith, N. Ralph, 1351 Tabor Rd.
1949. Gopadze, Illarion I., 1809 Delancey Pl.
1928. Gordon, Burgess L., Woman's Medical College of Pa.
1937. Gordon, William, 5345 Spruce St.
1941. Gouterman, Joseph I., 1930 Chestnut St.
1926. Grant, Francis Clark, Univ. of Pa. Hospital.
1940. Greene, Lloyd B., 136 S. 16th St.
1952. Greening, Roy R., 3400 Spruce St.
1955. Greenstein, Raphael H., 1710 Pine St. (3)
1934. Griffith, John Q., Jr., 6 N. Fredericksburg Ave., Margate, N. J.
1945. Griffiths, John E., Mermont Apartments, Bryn Mawr, Pa.
1941. Groff, Robert A., 1930 Chestnut St.
1952. Grotzinger, Paul J., 2121 Valley Road, Huntingdon Valley, Pa.
1952. Grove, D. Dwight, 230 N. Broad St.
1945. György, Paul, Univ. of Pa.
1935. Hadden, Samuel B., 250 S. 18th St. (3)
1951. Hafkenschiel, Joseph H., 3600 Spruce St.
1945. Hahn, George A., 255 S. 17th St.
1935. Haines, Harlan F., 134 S. State Rd., Upper Darby, Pa.
1955. Hallahan, John D., 104 W. Front St., Media, Pa.
1951. Hallett, Joseph W., 1001 Medical Arts Bldg., 16th & Walnut Sts.
1939. Hamblock, Leonard C., 1632 Spruce St.
1954. Hand, B. Marvin, 269 S. 19th St. (3)
1938. Hand, John G., 1724 Pine St.
1947. Hanes, William James, 218 E. Beechtree Lane, Wayne, Pa.
1952. Harer, W. Benson, State Rd. & Rogers Ave., Bywood, Pa.
1951. Harkins, Herbert P., 1930 Chestnut St.
1932. Harris, Stanley E., 229 Maple Ave., Delanco, N. J.
1948. Harris, T. N., 2222 N. 53rd St.
1929. Harrison, Francis G., 1900 Spruce St.
1933. Harrison, William John, 135 S. 17th St.
1926. Hartmann, Fred L., 1914 Pine St.
1946. Harvey, Edith E., 406 York Rd., Jenkintown, Pa.
1947. Harvey, Rolfe Marsh, Glenmary & Houston Rds., Radnor, Pa.
1935. Haskell, Benjamin F., 1426 Spruce St.
1946. Hatfield, C. Alexander, 330 S. 9th St.
1947. Havens, Walter Paul, Jr., 300 Cherry Lane, Wynnewood, Pa.
1947. Hawthorne, Herbert Reid, 255 S. 17th St. (3)
1952. Hayllar, Benjamin L., 801 Medical Arts Bldg.
1946. Hendrickson, Frank O., 1737 Chestnut St. (3)
1953. Henny, George C., 3400 N. Broad St. (40)
1944. Herbut, Peter A., Jefferson Medical College Hospital.
1953. *Herrick, William C., San Diego Naval Hospital, San Diego, California.
1951. Herrman, Clinton S., 255 S. 17th St.
1954. Herron, James R., 1930 Chestnut St., (3)
1944. Hershey, J. Ivan, 935 Bowman Ave., Wynnewood, Pa.
1924. Hewson, William, 1614 Locust St.
1949. Heyl, W. Meredith, 100 W. Coulter St.

*Military service

1955. Hills, Arthur G., University Hospital. (4)
1952. Hinkson, DeHaven, 329 N. 40th St.
1924. Hirst, John C., 2d., 500 N. 20th St.
1943. Hitschler, William J., Bethlehem Pike & Summit. (18)
1944. Hneleski, Ignatius S., 802 S. 48th St.
1943. Hockaday, Agnes, 316 Shadeland Ave., Drexel Hill, Pa.
1939. Hodes, Philip J., Univ. of Pa. Hospital,
1947. Hodges, John H., 1025 Walnut St.
1954. Hoeffel, Joseph M., Jr., 330 S. 9th St. (7)
1948. Hoffman, George L., Jr., 133 S. 36th St.
1954. Hollander, George 3500 Vista St. (36)
1949. Hollander, Joseph L., 36th & Spruce Sts.
1932. Hollingsworth, I. Pemberton, 411 N. Walnut St., West Chester, Pa.
1951. Hollis, Charles B., 1930 Chestnut St.
1952. Holloway, Edward E., 1739 W. Montgomery Ave.
1949. Hopkins, Henry U., Garden Court Apts. 47th & Pine Sts.
1953. Horan, Charles A., 734 N. 63rd St. (31)
1946. Horan, Gerald W., 5819 Chester Ave.
1947. Horwitz, Orville, Hospital of University of Pa. (4)
1953. Hostelley, W. Vernon, 1221 Harrison St. (24)
1950. Houlihan, Carl T., 728 S. 60th St.
1944. Housel, Edmund L., 255 S. 17th St.
1928. Houser, Karl Musser, 2035 Delancey Pl.
1948. Howland, Alvin Wilcox, 255 S. 17th St.
1946. Howson, John Yeatts, 316 Lancaster Ave., Wayne, Pa.
1951. Hubbard, John P., University of Penna., School of Medicine
1947. Huber, John Franklin, Temple University Hospital.
1937. Hughes, Joseph, 111 N. 49th St.
1939. Hughes, P. Boland, 419 Hillbrook Rd., Bryn Mawr, Pa.
1951. Hundley, J. Warren, 3818 Chestnut St.
1954. Hunsicker, William C., Jr. 255 S. 17th St. (3)
1946. Hunt, William T., Jr., 1930 Chestnut St.
1921. Hunter, Robert John, 928 N. 63rd St. (31)
1952. Hyman, Harold L., 3401 N. Broad St.
1950. Imbriglia, Joseph E., 329 Shadeland Ave., Drexel Hill, Pa.
1952. Imperiale, C. Charles, 1331 Pine St.
1935. Ingleby, Helen, Jewish Hospital, York & Tabor Rds.
1949. Ingraham, Norman R., Jr., Stenton and Whitemarsh Ave.
1951. Isard, Harold J., Mt. Sinai Hospital, 5th & Reed Sts.
1951. Israel, Harold L., 255 S. 17th St.
1947. Israel, S. Leon, 2116 Spruce St.
1952. Iverson, Preston C., 1930 Chestnut St.
1921. Ivy, Robert H., 36 Pennock Terrace, Lansdowne, Pa.
1917. Jackson, Chevalier, 3401 N. Broad St.
1932. Jackson, Chevalier L., 3401 N. Broad St.
1934. Jacobs, Maurice, 1831 Delancey Place.
1947. Jaeger, Rudolph, Jefferson Hospital.
1952. Janton, O. Henry, 269 S. 19th St.
1941. Jeffers, William A., University of Pa. Hospital.
1955. Jernstrom, Paul H., Jefferson Hospital. (7)
1942. Johnson, Julian, 406 Conshohocken State Rd., Narberth, Pa.
1938. Johnson, Thomas A., 135 S. 18th St. (3)

1952. Jonas, Karl C., 2601 Parkway.
1918. Jonas, Leon, 255 S. 17th St.
1924. Jones, Harold W., 1930 Chestnut St.
1936. Kain, Thomas M., 403 Cooper St., Camden, N. J.
1948. Kaplan, Louis, 2040 Pine St.
1938. Kasper, Kelvin A., 135 S. 18th St.
1945. Katz, G. Henry, 111 N. 49th St.
1941. Kauffman, M. Luther, Medical Arts Bldg., Jenkintown, Pa.
1947. Kay, Calvin Frederick, Univ. of Pa. Hospital.
1954. Kaye, Robert, Children's Hospital, 1740 Bainbridge St. (46)
1947. Keefer, George Pfahler, 3708 Woodland Ave., Drexel Hill, Pa.
1949. Keiserman, Joseph, 5460 Baltimore Ave.
1935. Kelly, George F. J., N. E. Cor. 20th and Chestnut Sts.
1932. Kelly, Herbert T., 1900 Spruce St.
1912. Kelly, Thomas C., 105 School Lane.
1941. Kennedy, Patrick J., 32 Hampden Rd., Upper Darby, Pa.
1947. Kennedy, William Blair, Medical School, Univ. of Pa.
1948. Kern, Franklin Moore, 408 E. Wynnewood Rd., Wynnewood, Pa.
1921. Kern, Richard A., Temple University Hospital.
1935. Keyes, Baldwin L., 2031 Locust St.
1930. Kimbrough, Robert A., Jr., 807 Spruce St.
1936. King, Orville C., 330 S. 9th St.
1952. Kirshner, Jacob J., 1930 Chestnut St.
1920. Klauder, Joseph V., 1934 Spruce St.
1920. Klein, Thomas, 250 S. 18th St.
1952. Kleinbart, Morris, 1922 Pine St.
1954. Kligman, Albert M., University Hospital, 36th & Spruce Sts. (4)
1934. Kline, Oram R., 514 Cooper St., Camden, N. J.
1948. Klingensmith, Paul O., 133 S. 36th St.
1932. Klopp, John W., Gwynedd Valley, Pa.
1919. Knipe, Norman L., 514 Baird Rd., Merion, Pa.
1908. Knowles, Frank C., 423 Warick Rd., Wynnewood, Pa.
1945. Kobler, H. B., 658 N. 63rd St.
1914. Kolmer, John A., Cynwyd, Pa.
1936. Konzelmann, Frank Williamson, 12 E. Lenox St., Chevy Chase, Md.
1949. Koop, C. Everett, 1740 Bainbridge St.
1952. Kornblueh, Igho H., Welsh Rd., & Verree Rd. (15)
1941. Krall, J. Thomas, 1927 Spruce St.
1948. Kramer, David W., 2007 Pine St.
1954. Krasnoff, Sidney O., Tabor Medical Bldg. (41)
1944. Krauss, Frederick Harold, 16th & Walnut Sts.
1952. Kravitz, Charles H., 1726 Widener Pl.
1949. Kremer, David N., 1918 Pine St.
1949. Kressler, Robert J., 330 S. 9th St.
1941. Krewson, William E., 3rd, 1930 Chestnut St.
1914. Krumbhaar, Edward B., School of Medicine, Univ. of Pa.
1953. Krumperman, LeRoy W., 3401 N. Broad St. (40)
1947. Kuhlenbeck, Hartwig, Woman's Medical College.
1947. La Boccetta, Alfred Charles, 2nd and Luzerne Sts.
1952. Lachman, John W., 3401 N. Broad St.
1949. La Clair, Charles H., Jr., 1021 W. Main St., Norristown, Pa
1952. Lafferty, Henry D., 37 S. 20th St.

1951. Lame, Edwin L., 51 N. 39th St.
1950. Lamont, Austin, 3400 Spruce St.
1946. Lampe, William T., 4207 Tyson Ave.
1952. Lang, Warren R., 255 S. 17th St.
1933. Langdon, Roy L., 5917 Greene St.
1941. Langner, Paul H., Jr., 1208 Edmonds Ave., Drexel Hill, Pa.
1945. Lansbury, John, 3401 N. Broad St.
1926. Laws, George M., 1907 Spruce St.
1936. Leaman, William G., Jr., Presidential Apts: Adams House B-909.
1950. Learner, Norman, 255 S. 17th St.
1920. Leavitt, Frederic Headley, 1527 Pine St.
1941. Leberman, Paul R., 136 S. 16th St.
1942. Lehman, James A., 255 S. 17th St.
1952. Lehman, J. Stauffer, 230 N. Broad St.
1951. Leivy, Frank E., 1321 Spruce St.
1944. Lell, William A., 333 S. 18th St. (3)
1935. Lemmon, William T., 133 S. 36th St.
1943. Leopold, Irving H., 1930 Chestnut St.
1955. Leopold, Robert L., 1832 Spruce St. (3)
1920. Leopold, Simon S., 255 S. 17th St.
1944. Lettiere, Anthony J., 425 E. State St., Trenton, N. J.
1933. Levering, J. Walter, Abington Memorial Hospital, Abington, Pa.
1915. Lewis, Fielding O., Providence Road, Media, Pa.
1938. Lewis, James P., 3815 Chestnut St.
1948. Lieber, Marshall M., 1025 Walnut St.
1955. Lieberman, George E., 2019 Pine St. (3)
1948. Lieberman, Louis M., 923 Belmont Ave.
1940. Limberger, William A., 301 S. Church St., West Chester, Pa.
1938. Lindauer, M. August, 133 S. 36th St.
1954. Lindenmuth, Woodrow W., 330 S. 9th St. (7)
1927. Lindsey, Walter H., 810 W. Dauphin St.
1936. Lintgen, Charles, 1930 Chestnut St.
1953. Lipsius, Edward I., 319 S. 16th St. (3)
1945. Lisker, Samuel, 255 S. 17th St. (3)
1944. Livezey, Mary M., 7200 Cresheim Rd.
1936. Llewellyn, Thomas H., 910 N. 63rd St.
1907. Lodholz, Edward, The Fairfax, 43rd & Locust Sts.
1931. Loewenberg, Samuel A., 1905 Spruce St.
1951. Long, Joseph P., 1930 Chestnut St.
1935. Long, William L., 2025 Walnut St.
1931. Longaker, Edwin P., 41 E. Montgomery Ave., Ardmore, Pa.
1951. Lorber, Stanley H., 3701 N. Broad St.
1942. Lownes, John B., 924 Medical Arts Bldg.
1936. Lucchesi, Pascal Francis, 601 E. Gorgas Lane.
1932. Lukens, Francis D. W., Univ. of Pa. Hospital.
1930. Lukens, Robert M., 1308 W. Hunting Park Ave.
1939. Luongo, Romeo A., 2054 Locust St.
1947. Lurie, Max B., Henry Phipps Institute, 7th and Lombard Sts.
1951. Luscombe, Herbert A., 136 S. 16th St.
1952. Lutman, Frank C., 100 W. Coulter St.
1919. Lynch, Frank B., Jr., Germantown Hosp., Penn and Chew Sts.
1950. Lynch, J. Edward, 255 S. 17th St.

1953. Lyons, John W., 255 S. 17th St. (3)
1933. McAndrews, Leo F., Bryn Mawr Medical Bldg., Bryn Mawr, Pa.
1952. McCabe, Edward S., 136 S. 16th St. (2)
1932. McCahey, James F., 1534 Pine St.
1900. McCarthy, Daniel J., 2025 Walnut St.
1936. McCarthy, Patrick A., 229 E. Price St. (44)
1935. McClenahan, William U., 1 Summit Ave.
1931. McCloskey, Edward, 7 E. Chestnut Ave. (18)
1953. McCloskey, Joseph F., Jefferson Hospital. (7)
1955. McClure, Carroll R., 17 S. Church St., W. Chester, Pa.
1935. McConnell, James W., 7719 Parkview Rd., Upper Darby, Pa.
1934. McCouch, Grayson P., Medical School, Univ. of Pa.
1938. McCrea, Lowrain E., 1930 Chestnut St.
1954. McCrory, Wallace W., Children's Hospital, 1740 Bainbridge St. (46)
1937. McCutcheon, Morton, Cambridge Apts.
1942. McDonald, P. Robb, 1930 Chestnut St.
1953. McDonnell, William V., 1025 Walnut St. (7)
1952. McElroy, Robert C., 133 S. 36th St.
1950. McFadden, William M., 1187 E. Washington Lane.
1949. McGavic, John S., 601 Montgomery Ave., Bryn Mawr, Pa.
1945. McGee, Lemuel Clyde, Hercules Powder Company, Wilmington, Del.
1954. McGehee, Edward H., 15 E. Highland Ave. (18)
1952. McGlade, Thomas H., 719 Cooper St., Camden, N. J.
1933. McLaughlin, James S., 330 S. 9th St.
1924. McMillan, Thomas M., 1901 Walnut St. (3)
1924. McPhedran, F. Maurice, Germantown Hosp., Penn and Chew Sts.
1955. McStravog, Lawrence J., 6910 Market St., Upper Darby, Pa.
1954. MacFadyen, Bruce V., 135 S. 18th St. (3)
1943. Macfarlan, Douglas, 1805 Chestnut St.
1932. Macfarlane, Catharine, 136 S. 16th St.
1947. Machella, Thomas E., Univ. of Pa. Hospital.
1950. Mackmull, Gulden, Greene & Coulter St. (44)
1949. MacNeal, Perry Scott, 330 S. 9th St.
1939. Macneill, Norman N., 5807 Chew St.
1951. Mac Neish, W. J., Medical Arts Bldg., 16th & Walnut Sts.
1955. Macy, Dorothy, Jr., 5317 Wayne Ave. (44)
1935. Maeder, LeRoy M. A., 1910 Rittenhouse Sq.
1952. Mahoney, J. Francis, 250 S. 18th St.
1942. Manges, Lewis C., Jr., 319 S. 16th St.
1954. Manges, Willis E., Methodist Hospital, Broad & Wolf Sts. (48)
1936. Mann, Bernard, 2019 Pine St.
1953. Marbach, A. Herbert, 1307 Tabor Rd. (41)
1948. Marden, Philip Ayer, 1912 Spruce St.
1937. Margolies, Alexander, 1351 Tabor Rd.
1955. Margolies, M. Price, 133 S. 36th St. (4)
1950. Mark, George E., 3401 N. Broad St.
1950. Marshall, E. Wayne, Jr., 1520 Spruce St.
1941. Martin, James R., 1025 Walnut St. (7)
1951. Martin, William L., Hahnemann Hospital.
1952. Martucci, Albert A., 1460 E. Cheltenham Ave.
1953. Marx, Halvey E., 282 N. Lansdowne Ave., Landsowne, Pa.
1953. Massey, Franklin C., 136 S. 16th St. (2)

1939. May, Hans, 255 S. 17th St.
1951. Mayock, Robert L., 3600 Spruce St. (4)
1934. Mecray, Paul M., 405 Cooper St., Camden, N. J.
1952. Mecray, Paul, Jr., 405 Loucroft Ave., Haddonfield, N. J.
1951. Medinger, Frederick G., 255 S. 17th St.
1955. Melnick, Theodore, 1152 N. 63rd St. (31)
1941. Mendell, Theodore H., 2023 Spruce St.
1951. Mendelssohn, Edwin, 255 S. 17th St.
1949. Menkin, Valy, 3401 N. Broad St.
1943. Meranze, David R., 1031 Lakeside Ave.
1955. Mervine, Thomas B., 133 S. 36th St. (4)
1955. Meyer, Eugene A., 427 Cooper St., Camden, N. J.
1937. Meyer, George Phillip, 410 Haddon Ave., Camden, N. J.
1935. Miller, Ford A., 4016 Chestnut St.
1946. Miller, Franklin R., Snyder-Jones Clinic, Winfield, Kan.
1939. Miller, Malcolm W., Lankenau Medical Bldg. (31)
1939. Miller, Merle M., 6013 Greene St.
1932. Miller, M. Valentine, 114 W. Phil-Ellena St.
1921. Miller, T. Grier, 133 S. 36th St.
1955. Miller, William H., Fitzgerald Mercy Hospital, Darby, Pa.
1952. Minehart, John R., 4821 Germantown Ave.
1952. Mintz, S. S., 1429 S. 5th St.
1937. Missett, Joseph Vincent, Jr., 2031 Locust St.
1904. Mitchell, Charles Franklin, 2003 Pine St.
1950. Mitchell, John McK., Medical School, Univ. of Pa.
1952. Mitchell, Robert McNair, 330 S. 9th St.
1948. Mogavero, Francesco, 1930 Chestnut St.
1932. Mohler, Roy W., 1806 Spruce St.
1936. Montgomery, Hugh, 119 Glenn Road, Ardmore, Pa.
1936. Montgomery, John B., 1930 Chestnut St.
1932. Montgomery, Thaddeus L., 2031 Locust St.
1935. Moore, John Royal, 3401 N. Broad St.
1947. Moore, Matthew Thibaud, 1813 Delancey Pl.
1924. Moorhead, Stirling W., 1523 Pine St.
1936. Morgan, David R., Jefferson Medical College.
1893. Morris, Elliston J., 439 Midland Ave., St. Davids, Del. Co., Pa.
1944. Morris, Harold H., Villa Nova, Pa.
1945. Morris, I. Paul, 1939 Cheltenham Ave.
1941. Mucklé, Craig Wright, 330 S. 9th St. (7)
1929. Mudd, Stuart, Department of Bacteriology, Medical School, Univ. of Pa.
1949. Mulholland, Stanford W., 22nd & Parkway.
1935. Mullen, Carroll Richard, 2025 Locust St.
1934. Mullen, Edward A., 472 Roxborough Ave.
1930. Murphy, Douglas P., Univ. of Pa. Hospital.
1953. Murphy, Edward J., Bryn Mawr Medical Bldg., Bryn Mawr, Pa.
1955. Murtagh, Frederick, 5603 Greene St. (44)
1955. Mussells, F. Lloyd, Philadelphia General Hospital (4)
1951. Myers, David, 304 S. 19th St.
1955. Nachod, Grace R., 5501 Greene St. (44)
1945. Naide, Meyer, 2034 Spruce St.
1951. Naidoff, David, 3500 Tudor St. (36)
1950. Nardone, Anthony A., 912 S. 49th St.

1948. Neese, Paul H., 17 Derwen Road, Cynwyd, Pa.
1936. Nelson, Guy M., 255 S. 17th St.
1943. Nelson, Waldo E., 615 Moreno Rd., Narberth, Pa.
1955. Nemir, Paul, Jr., 255 S. 17th St. (3)
1905. Newcomet, William S., 3501 Baring St.
1938. Newton, Zachariah B., 601 E. Sedgwick St.
1935. Nicholson, Jesse Thompson, Pennsylvania Hospital.
1950. Nixon, Norman, 111 N. 49th St.
1947. Noone, Ernest L., 4501 Cedar Lane, Drexel Hill, Pa.
1905. Norris, Charles C., Darby and Goshen Roads, Bryn Mawr, Pa.
1954. Norris, Charles M., 3401 N. Broad St. (40)
1938. Norris, Robert F., 513 Wynnewood Ave., Wynnewood, Pa.
1947. O'Keefe, John J., 255 South 17th St.
1954. Olsen, Axel K., 230 N. Broad St. (2)
1913. O'Neal, Alexander Hay, St. Davids, Pa.
1949. O'Neill, James F., 140 Roslyn Ave., Glenside, Pa.
1954. O'Neill, Thomas J. E., 269 S. 19th St. (3)
1947. Ornsteen, A. M., 2007 Delancey Pl.
1947. Ornston, Darius Gray, 36 Carpenter Lane.
1936. Orr, Theodore E., 1930 Chestnut St.
1955. Ottenberg, Donald J., 3519 N. Broad St. (40)
1913. Outerbridge, George W., 1927 Spruce St.
1949. Padis, Nicholas, 255 S. 17th St.
1954. Palmer, Louis H., Bryn Mawr Medical Bldg., Bryn Mawr, Pa.
1909. Parish, Benjamin Dores, 1927 Spruce St.
1945. Park, Felix Roman, Medical Arts Bldg., Tulsa, Okla.
1940. Parker, Alan P., Bryn Mawr Medical Bldg., Bryn Mawr, Pa.
1948. Parkhurst, Leonard Woods, 330 S. 9th St.
1944. Paschkis, Karl E. Jefferson Medical College.
1952. Paxson, Newlin F., 250 S. 18th St.
1932. Payne, Franklin L., Univ. of Pa. Hospital.
1954. Pearce, Alexander E., 1420 Race St. (2)
1943. Pearson, Gerald H. J., Presidential Apts.—Adams House.
1954. Pearson, Manuel M., 111 N. 49th St. (39)
1952. Peck, Roy I. 3400 Spruce St.
1930. Pendergrass, Eugene P., Univ. of Pa. Hospital.
1953. Penneys, Raymond, University Hospital. (4)
1914. Pepper, O. H. Perry, Ithan, Pa.
1916. Percival, Milton Fraser, 2332 S. Broad St.
1942. Perkins, William Harvey, 1025 Walnut St.
1946. Perloff, William Harry, 3521 N. Broad St.
1951. Perri, Angelo M., 814 Federal St.
1953. Persky, Abram H., 1737 Chestnut St. (3)
1940. Pessel, Johannes F., 224 West State St., Trenton, N. J.
1952. Peters, Michael, 262 W. Broad St., Telford, Pa.
1940. Pettit, Horace, Times Medical Bldg., Ardmore, Pa.
1949. Pettit, Mary DeWitt, 1930 Spruce St.
1905. Pfahler, George E., 1930 Chestnut St.
1915. Pfeiffer, Damon B., Meadowbrook, Pa.
1946. Pfeiffer, Mildred C. J., 358 Valley Rd., Merion, Pa.
1935. Phillips, Arthur W., 3904 Walnut St.
1911. Piersol, George Morris, 308 Kent Rd., Wynnewood, Pa.

1948. Pierson, Daniel B., Jr., 1830 Delancey St.
1933. Pillsbury, Donald M., Univ. of Pa. Hospital.
1950. Pincus, Irwin J., 269 S. 19th St.
1951. Poinsard, Paul J., 2031 Locust St.
1937. Polk, David Stewart, Rosemont, Pa.
1953. Porreca, George A., 1912 Spruce St. (3)
1932. Porter, Roland De Lance, Abington, Pa.
1953. Posey, William C., Jr., 600 Suburban Square Bldg., Ardmore, Pa.
1951. Post, Joseph W., 1930 Chestnut St.
1951. Pote, Harry H., 4032 Walnut St.
1951. Pressman, Robert S., 170 W. Olney Ave. (20)
1947. Prickett, John A., Warrington, Bucks County, Pa.
1954. Prince, Leon N., 2025 Spruce St. (3)
1931. Pryor, Charles Allen, 255 S. 17th St.
1952. Pugh, James E., 614 Church Lane, Yeadon, Pa.
1947. Putney, Floyd Johnson, 1719 Rittenhouse Sq.
1943. Radbill, Samuel X, 7043 Elmwood Ave.
1953. Radbill, Sidney G., 37 S. 20th St. (3)
1945. Rakoff, Abraham Edward, 269 S. 19th St.
1953. Ralston, Edgar L., 3400 Spruce St. (4)
1931. Ramsey, Frank M., 620 E. Willow Grove Ave.
1953. Ranieri, Tito A., Bryn Mawr Medical Bldg., Bryn Mawr, Pa.
1941. Rankin, Charles A., Ludlow & Heather Rd., Upper Darby, Pa.
1946. Rapoport, Milton, Children's Hospital, 1740 Bainbridge St.
1951. Rathmell, Thomas K., 446 Bellevue Ave., Trenton, N. J.
1926. Ravdin, I. S., Univ. of Pa. Hospital.
1954. Reagan, Lindley B., 175 Madison Ave., Mt. Holly, N. J.
1928. Reese, Warren S., 2118 Locust St.
1925. Reeves, Rufus S., Presidential Apts., A-910.
1920. Rehfuss, Martin E., 131 St. George's Rd., Ardmore, Pa.
1921. Reiff, E. Paul, 1927 Spruce St.
1919. Reimann, Stanley P., 703 W. Phil-Ellena St.
1951. Rentschler, Laurence B., 5800 Ridge Ave.
1945. Rhoads, Jonathan E., Univ. of Pa. Hospital.
1936. Richards, James L. Bryn Mawr Medical Bldg., Bryn Mawr, Pa.
1951. Richardson, Fred Mac D., 160 Carpenter Lane.
1919. Richardson, Russell, Phila. Tuberculosis Sanitorium, #4, Corinthian & Girard Aves.
1951. Riegel, Donald, 5110 Chester Ave.
1942. Riggs, Helena E., 150 Hewitt Rd., Wyncote, Pa.
1936. Ritter, Joseph A., 2405 N. 54th St.
1932. Robbins, Frederick R., 317 Milbank Rd., Bryn Mawr, Pa.
1952. Robbins, Robert, 3401 N. Broad St.
1954. Roberts, Brooke, 3400 Spruce St. (4)
1939. Roberts, Ella, 133 S. 36th St.
1954. Roberts, Norbert J., Penna. Railroad, 1617 Penna. Blvd. (3)
1899. Roberts, Walter, 335 S. Camac St. (7)
1932. Robertson, Harold F., 2118 Pine St.
1954. Robertson, Hugh, 255 S. 17th St. (3)
1903. Robertson, William Egbert, 2118 Pine St.
1938. Roche, Philip Q., 255 S. 17th St.
1912. Rodman, John Stewart, 524 Manor Rd., Wynnewood, Pa.
1954. Roesler, Elizabeth Mertens-, 224 W. School House La. (44)

1955. Rogers, Fred B., 3401 N. Broad St. (40)
1934. Rogers, Harry L., 255 S. 17th St.
1951. Ronis, Bernard J., 2106 Spruce St.
1948. Roscoe, Constantine R., 7226 Castor Ave.
1928. Rose, Edward, 426 Owen Rd., Wynnewood, Pa.
1936. Rose, Elizabeth Kirk, 426 Owen Rd., Wynnewood, Pa.
1952. Rose, S. Brandt, Chestnut Hill Hospital.
1946. Rosemond, George Parrott, Temple University, Broad & Ontario Sts.
1948. Rothman, Maurice M., 1727 Spruce St.
1932. Rothrock, Harry A., West Chester, Pa.
1951. Rouse, George P., Jr., 2031 Locust St.
1952. Roxby, Bruce S., 5501 Greene St.
1937. Roxby, John B., 113 Yale Ave., Swarthmore, Pa.
1955. Roxby, John B., Jr., 4821 Germantown Ave. (44)
1949. Royster, Henry P., 3400 Spruce St.
1941. Royster, Hubert A., Jr., The Mermont, Bryn Mawr, Pa.
1952. Rubin, I. Edward, 255 S. 17th St. (3)
1933. Rudolphy, Jay Besson, 230 S. 21st St.
1946. Rupp, Charles, 133 S. 36th St.
1947. Rush, Alexander, 330 South 9th St.
1954. Ruth, Henry S., 610 Moreno Rd., Narberth, Pa.
1945. Rynes, Samuel E., 334 S. 21st St.
1952. Sain, Fletcher D., Lower Bucks Co. Hospital, Bristol, Pa.
1952. Salner, Nathan P., 6812 Castor Ave. (24)
1952. Saltzman, Maurice, 1923 Spruce St.
1944. Sampson, David Alan, 726 Braeburn Lane, Penn Valley, Narberth, Pa.
1954. Sampson, Martin C., 418 S. 47th St. (43)
1936. Sands, Joseph Evans, Rosemont, Pa.
1950. Sarner, Joseph B., 269 S. 19th St. (3)
1949. Saul, Leon J., Highland Ave., Media, Pa.
1908. Sautter, Albert C., Germantown Professional Bldg.
1954. Savacool, J. Woodrow, 146 W. Tulpehocken St. (44)
1955. Sawchuk, Steven, 6809 Castor Ave. (24)
1947. Saÿen, John J., 506 Montgomery Ave., Haverford, Pa.
1948. Scarano, Joseph Albert, 1432 S. Broad St.
1917. Schaeffer, J. Parsons, Daniel Baugh Institute, 307 S. 11th St.
1929. Scheffey, Lewis C., 255 S. 17th St.
1942. Scheie, Harold G., 313 S. 17th St.
1929. Schenck, Harry P., 1235 Wyngate Rd., Wynnewood, Pa.
1945. Schlezinger, Nathan S., 255 S. 17th St.
1917. Schnabel, Truman G., 1704 Pine St.
1917. Schoff, Charles H., Media, Pa.
1955. Schreader, Charles J., 318 Godfrey Ave. (20)
1952. Schulz, Norbert J., 1901 Walnut St.
1921. Schumann, Edward A., 8815 Germantown Ave. (18)
1950. Schumann, Francis N., 8811 Germantown Ave.
1948. Schwarz, Gabriel A., 1711 Rittenhouse Sq.
1955. Schwegman, Cletus W., Hospital of the University of Penna. (4)
1930. Scott, John Porter, Children's Hospital, 1740 Bainbridge St.
1950. Scott, Michael, 255 S. 17th St.
1940. Scott, T. F. McNair, Children's Hospital, 1740 Bainbridge St.
1952. Seifer, Arthur F., 3401 N. Broad St.

1954. Seifter, Joseph, Wyeth Institute for Medical Research (1)
1951. Seitchik, Joseph N., 1417 Race St., Hahnemann Medical College Annex.
1952. Semisch, Charles W., III, 5329 Rising Sun Ave.
1951. Shaffer, Bertram, 1825 Pine St.
1950. Sharp, Reuben L., 719 Cooper St., Camden, N. J.
1928. Sharpless, Frederick C., Beach Haven, N. J.
1948. Shay, Harry, 3400 N. Broad St.
1955. Shechter, Fred R., 1923 Spruce St. (3)
1954. Shelley, Walter B., University Hospital, 36th & Spruce Sts. (4)
1955. Shenkin, Henry A., 255 S. 17th St. (3)
1946. Shepherd, Samuel Garfield, 2039 Pine St.
1932. Sheridan, Joyce T., 412 W. Durham St.
1936. Shipman, James Shelby, 255 S. 17th St.
1935. Shoemaker, Robert, 3rd, 68 Byberry Rd., Hatboro, Pa.
1946. Shoup, George Daniel, 121 W. Walnut Lane. (44)
1955. Shubin, Harry, 6601 N. 21st St. (38)
1952. Shuman, Charles R., 3401 N. Broad St.
1936. Shuster, Benjamin H., 1824 Pine St.
1949. Sidlick, David M., 255 S. 17th St.
1941. Silcox, Louis E., 255 S. 17th St.
1955. Silverstein, Alexander, 2114 Pine St. (3)
1954. Singmaster, Laurence, 255 S. 17th St. (3)
1955. Sklaroff, David M., Einstein Medical Center. (41)
1952. Skromak, Stanley J., 5108 Torresdale Ave.
1929. Smith, Austin T., 1830 Spruce St.
1955. Smith, J. Winslow, 220 N. 15th St. (2)
1933. Smith, Lauren Howe, 111 N. 49th St.
1952. Smith, Richard T., 330 S. 9th St.
1927. Smyth, Calvin Mason, Abington Memorial Hospital, Abington, Pa.
1951. Snape, William J., 573 Stevens St., Camden, N. J.
1938. Snodgrass, L. E., 709 Walnut St. (6)
1953. Snyder, G. Gordon, Bryn Mawr Medical Bldg., Bryn Mawr, Pa.
1935. Sokoloff, Martin J., 255 S. 17th St.
1940. Soloff, Louis A., 255 S. 17th St.
1950. Somerville, William J., 2022 Locust St.
1935. Sommer, George N. J., 120 W. State St., Trenton, N. J.
1944. Sommer, George N. J., Jr., 120 W. State St., Trenton, N. J.
1952. Sones, Maurice, Mt. Airy Medical Bldg.
1951. Sonneborn, Duane G., 1200 W. Erie Ave.
1928. Spaeth, Edmund B., 1930 Chestnut St.
1937. Spangler, John Luther, Devon, Pa.
1935. Spiegel, Ernest, 6807 Lawnton Ave., Oak Lane.
1955. Spitz, Eugene B., Children's Hospital (46)
1944. Stadie, William C., University Hospital. (4)
1927. Starr, Isaac, 505 Cresheim Valley Rd.
1952. Stauffer, Herbert M., 3401 N. Broad St.
1952. Stayman, Joseph W., Jr., Germantown Hospital.
1945. Stecher, H. Armin, 1510 Darby Rd., Havertown, Pa.
1955. Steel, Howard H., 3401 N. Broad St. (40)
1953. Steele, Brandt F., 1640 Pine St. (3)
1952. Steele, Eleanor A., 1640 Pine St.
1952. Steiger, William A., 3401 N. Broad St.

1946. Stein, Irvin, 1936 Spruce St.
1953. Stein, Raymond O., 269 S. 19th St. (3)
1936. Steinfield, Edward, N. E. Cor. 18th and Chestnut Sts.
1942. Stengel, Alfred, Jr., 160 Hodge Rd., Princeton, N. J.
1951. Sterling, Julian A., 255 S. 17th St.
1948. Stevens, Lloyd W., 133 S. 36th St.
1955. Stevenson, Theodore D., Lankenau Medical Bldg. (31)
1941. Stewart, Winifred B., 1930 Spruce St.
1949. Stockwell, Eunice L., 2018 Pine St.
1925. Stokes, John H., 4228 Spruce St.
1928. Stokes, Joseph, Jr., Children's Hospital, 1740 Bainbridge St.
1943. Stokes, S. Emlen, 129 Chester Ave., Moorestown, N. J.
1954. Stone, Hrant H., E. Shawmont Ave. (28)
1952. Stoner, Emery K., 222 E. Mt. Pleasant Ave.
1953. Strawbridge, Rendall R., 269 S. 19th St. (3)
1923. Strecker, Edward A., 111 N. 49th St.
1923. Stroud, William Daniel, 1011 Clinton St.
1937. Strumia, Max M., Penn Valley, Narberth, Pa.
1937. Sturgis, Margaret C., 349 Wistar Rd., Wynnewood, Pa.
1927. Sturgis, Samuel Booth, 349 Wistar Rd., Wynnewood, Pa.
1934. Summey, Thomas J., Burlington County Hosp., Mt. Holly, N. J.
1930. Sunderman, F. William, 1833 Delancey Place (3)
1936. Surver, James Miller, 1015 Walnut St.
1954. Sussman, Marcel S., 101 S. 20th St. (3)
1952. Sweeney, Francis X., 2351 E. Allegheny Ave. (34)
1944. Swenson, Paul C., 332 Cherry Lane, Wynnewood, Pa.
1955. Taggart, Harold A., 235 N. 15th St. (2)
1948. Tait, Edwin Forbes, 1324 Main St., Norristown, Pa.
1943. Tassman, Isaac S., 136 S. 16th St.
1946. Tauber, Robert, 2019 Walnut St.
1952. Taylor, Ann Gray, 6364 Germantown Ave.
1931. Taylor, Norman H., 100 W. Evergreen Ave.
1951. Theodos, Peter A., 1930 Chestnut St.
1946. Thomas, Carmen C., 1930 Chestnut St.
1928. Thomas, J. Earl, Drexel Hill, Pa.
1952. Thompson, Charles M., 255 S. 17th St.
1927. Thorington, J. Monroe, 2031 Chestnut St.
1936. Thornton, Mary Bickings-, 2703 West Somerset St.
1936. Thorp, Francis Quicksall, 4900 Penn St.
1936. Thudium, William J., 136 S. 16th St.
1954. Tindall, Dorothy D., 37 S. 20th St. (3)
1935. Tocantins, Leandro Maués, 1025 Walnut St.
1945. Toland, Joseph J., Jr., 1241 W. Lehigh Ave.
1935. Toland, Owen J., Episcopal Hospital, Front and Lehigh Ave.
1952. Tompkins, Winslow T., 330 S. 9th St.
1952. Tondreau, Roderick L., 6470 Drexel Rd. (31)
1953. Topping, Norman H., 3446 Walnut St. (4)
1949. Tornay, Anthony S., 37 S. 20th St.
1945. Tourish, William J., 250 S. 17th St.
1949. Town, Arno E., 255 S. 17th St.
1936. Towson, Charles Emory, Germantown Professional Bldg.
1908. Tracy, Stephen E., Old Arch Rd., Norristown, Pa.
1955. Trimpi, Howard D., 3701 N. Broad St. (40)

1954. Trommer, Philip R., 258 S. 18th St. (3)
1953. Tropea, Frank, Jr., 269 S. 19th St. (3)
1947. Trueman, Robert H., 1930 Chestnut St.
1954. Truitt, R. Marshall, Jr., 740 West View St. (19)
1926. Tucker, Gabriel, 429 Montgomery Ave., Haverford, Pa.
1938. Tuft, Louis, 1530 Locust St.
1933. Tumen, Henry J., 1900 Rittenhouse Sq.
1938. Turman, Christopher M., Wyncote, Pa.
1923. Turner, Creighton H., 1731 Pine St.
1954. Turner, Linton W., 3401 N. Broad St. (40)
1952. Twining, H. Earle, 2026 Delancey St.
1929. Tyson, Ralph M., 255 S. 17th St.
1937. Uhle, Charles A. W., 255 S. 17th St.
1953. Ulin, Alexander W., 230 N. Broad St. (7)
1907. Ullom, Josephus T., Carpenter and Quincy Sts.
1950. Valdes-Dapena, Antonio, 40 Lokesley Rd., Merion, Pa
1937. Vander Veer, Joseph B., 330 S. 9th St.
1937. Van Loon, Emily Lois, 1930 Chestnut St.
1933. Vastine, Jacob H., 2nd, 136 S. 16th St.
1947. Vastine, Mary F., R. #2, Biglerville, Pa.
1955. Viek, Peter, 1400 York Road, Abington, Pa.
1952. Vischer, Thomas J., 5903 Greene St.
1940. Voegelin, Adrian W., Germantown Professional Bldg.
1941. Vogel, Stoughton R., 151 W. Tulpehocken St.
1927. Wagers, Arthur J., 1429 Spruce St.
1949. Wagner, Frederick B., Jr., 800 Chauncy Road, Narberth, Pa.
1949. Wagner, Joseph A., 2720 Darby Rd., Havertown, Pa.
1928. Wagoner, George W., Medical Bldg., Bryn Mawr, Pa.
1954. Wainer, Amos S., 1621 Spruce St. (2)
1938. Waldman, Joseph, 404 Meadowbrook Lane.
1955. Waldron, Jerome M., 330 S. 9th St. (7)
1952. Walker, James M., 3400 Spruce St.
1932. Walkling, Adolph A., 136 S. 16th St.
1955. Warner, Halsey F., 100 W. Coulter St. (44)
1954. Waugh, Elizabeth S., 348 Green Lane. (28)
1933. Waygood, James J., 736 Westview St. (19)
1952. Weaver, Harry S., Jr., 37 S. 20th St.
1955. Weaver, Robert L., 530 Walnut St. (5)
1941. Weaver, Ruth H., 2601 Parkway.
1953. Weber, Lennard L., 255 S. 17th St. (3)
1930. Weeder, S. Dana, 250 W. Tulpehocken St.
1920. Weidman, Fred D., 20 Tenby Rd., Havertown, Pa.
1954. Weiner, Louis H., 4025 Girard Ave. (4)
1952. Weinstein, George L., 255 S. 17th St.
1954. Weinstock, Horace L., 329 S. 18th St. (3)
1933. Weiss, Benjamin P., The Lenox, 13th and Spruce Sts.
1923. Weiss, Edward, 269 S. 19th St.
1950. Weiss, Sidney, 1930 Chestnut St.
1951. Welty, Jack W., Montgomery Ave. & Owen Rd., Wynnewood, Pa.
1955. Wendkos, Martin H., 4015 Baltimore Ave. (4)
1935. Whelan, G. L., 2100 Walnut St.
1921. Whitaker, William, 4645 Oakland St.
1936. White, Ellen Pawling Corson-, Gladwyne, Pa.

1925. Widmann, Bernard P., 250 S. 18th St.
1954. Wieder, Henry S., Jr., 330 S. 9th St. (7)
1936. Wilder, Theodore S., 6013 Greene St.
1939. Willauer, George, 6129 Greene St.
1907. Williams, Carl, School Lane and Greene St.
1937. Williams, John C., 6370 Germantown Ave.
1920. Williams, Philip F., 355 Bala Ave., Bala-Cynwyd, Pa.
1950. Williams, R. G., Medical School, Univ. of Pa.
1927. Williamson, Ernest G., 6353 Woodbine Ave.
1949. Willson, J. Robert, 3401 N. Broad St.
1921. Wilson, George, 133 S. 36th St.
1945. Wilson, John F., 2013 Delancey Pl.
1953. Wilson, Julius L., Henry Phipps Institute, 7th & Lombard Sts. (47)
1937. Wilson, Ross B., Lankenau Medical Bldg. (31)
1949. Wilson, William W., 133 S. 36th St.
1948. Winkelman, Nathaniel W., 1911 Spruce St.
1948. Winston, Julius, 5839 Chester Ave.
1941. Wirts, C. Wilmer, 2017 Delancey St.
1953. Wohl, George T., 281 Henley Rd. (31)
1933. Wohl, Michael G., 1727 Pine St.
1944. Wolf, Lewis R., 3474 Frankford Ave.
1918. Wolferth, Charles C., 133 S. 36th St.
1942. Wolman, Irving J. 7607 Woodlawn Ave. (26)
1893. Wood, Alfred C., 2035 Walnut St.
1950. Wood, Dorothy D., 2035 Walnut St.
1932. Wood, Francis C., 212 Laurel Lane, Haverford, Pa.
1903. Wood, Horatio C., Jr., 319 S. 41st St.
1944. Wood, H. Curtis, Jr., Skippack Pk., Whitemarsh, Pa.
1953. Woodruff, Marston T., 4940 Penn St. (24)
1928. Wright, Carroll S., 1402 Spruce St.
1943. Yawger, Nathaniel S., Exeter Rd., Haverford, Pa.
1921. Ylvisaker, Lauritz S., P.O. Box 268, Bryn Mawr, Pa.
1941. Young, Barton R., Germantown Hospital.
1953. Zarafonetis, Chris, 3401 N. Broad St. (40)
1955. Zatuchni, Jacob, 3401 N. Broad St. (40)
1946. Zeigerman, Joseph H., 1836 Delancey St.
1894. Zentmayer, William, 265 Forrest Rd., Merion, Pa.
1952. Zillesen, Frederick O., Jeanes Hospital.
1949. Zintl, William J., Upper Darby, Pa.
1933. Zulick, J. Donald, Abington Memorial Hospital, Abington, Pa.

Associate Fellows

ELECTED

1951. Shorey, Jeannette McC., 185 Meredith Ave., Rosemont, Pa.
1952. Talbot, Timothy R., Jr., University Hospital, 36th & Spruce Sts.

Non-Resident Fellows

ELECTED

1912. Addison, William H. F., 286 East Sidney Avenue, Mt. Vernon, N. Y.
947. Allbritten, Frank F., Jr., Univ. of Kansas Medical Center, Kansas City 3, Kansas

1941. Aronson, Roland S., Medical Laboratory, Ft. McPherson, Ga.
1934. Bank, Joseph, 800 N. First Ave., Phoenix, Arizona.
1932. Behney, Charles A., Dept. of Health, Old DeWitt Rd., Lansing, Mich.
1949. Bixby, Edward W., 61 W. Ross St., Wilkes-Barre, Pa.
1937. Braceland, Francis J., The Institute of Living, 200 Retreat Ave., Hartford, Conn.
1936. Brown, Charles L., 591 Montgomery St., Jersey City. (2)
1948. *Brown, Robert B., U. S. Naval Hospital, Bethesda, Md.
1908. Cadbury, William W., 274 W. Main St., Moorestown, N. J.
1936. Camero, Anthony R., 679 S. Westlake Ave., Los Angeles, Cal.
1948. Chapman, John P., Hotel Virginia, Palma de Mallorca, Balearic Islands, Spain.
1941. Cheleden, John, 133 Broadway, Daytona Beach, Fla.
1930. Clarke, Francis Mann, 116 New St., New Brunswick, N. J.
1926. Clerf, Louis H., 5575–8th Ave., North, St. Petersburg, Fla.
1930. Cottrell, James E., Kennedy Veteran's Administration Hospital, Richmond 19, Va.
1940. Crowe, Aldrich C., 1208 Ocean Ave., Ocean City, N. J.
1947. Cutler, Norman L., 1300 Harrison St., Wilmington, Del.
1941. *Cuttle, Tracy D., U. S. Naval Hospital, F.P.O., San Francisco, Cal.
1955. Daugherty, J. Arthur, 610 N. Third St., Harrisburg, Pa.
1941. Dixon, Harold M., 8511 Antler Drive, St. Louis, Mo.
1897. Dorland, W. A. Newman, 106 S. Boulevard, Tampa, Fla.
1951. Ellis, Mackinnon, Mountain Home Veteran's Hospital, Mountain Home, Tenn.
1951. Ervin, Carl E., 240 North Third Street, Harrisburg, Pa.
1944. Estes, W. L., Jr., Bethlehem, Pa.
1952. Faller, Constantine P., 127 State St., Harrisburg, Pa.
1940. Forrester, James S., Harrisburg Polyclinic Hospital, Harrisburg, Pa.
1946. Forster, Francis M., Georgetown University Hospital, Washington, D. C.
1947. Gaskill, Herbert S., 250 Ash St., Denver, Colorado.
1913. Gates, Nathaniel, 10 Peterboro, Detroit, Mich.
1931. Gilman, Robert Louis, Cheyney, Pa.
1954. Godfrey, Ellwood W., Princeton Hospital, Princeton, N. J.
1947. Grady, Hugh G., Armed Forces Institute, Washington, D. C.
1952. Grieco, Reynold M., 2 W. 4th St., Williamsport, Pa.
1952. Gross, Elmer R., 817 W. Street, Wilmington, Del.
1933. Gruber, Charles M., School of Medicine, College of Medical Evangelists, Loma Linda, Calif.
1936. Guthrie, Donald, 118 S. Wilbur Ave., Sayre, Pa.
1955. Harris, John H., 1301-A N. Second St., Harrisburg, Pa.
1936. Hatch, Lerleen Clement, 2184 Ayers Ave., Akron, Ohio.
1928. Hayman, Joseph Marchant, Jr., Tufts College Medical School, Boston, Mass.
1933. Hitzrot, Lewis H., Medical Director, Mercersburg Academy, Mercersburg, Pa.
1950. Horn, Robert C., Henry Ford Hospital, Detroit, Mich.
1938. Howell, John C., 1104 Logan Ave., Tyrone, Pa.
1936. Hughes, Brady A., 312 Euclid Ave., Mt. Brook, Birmingham, Ala.
1953. Imber, Irving, 420 Walnut St., Reading, Pa.
1952. Jones, Ralph Jr., Jackson Memorial Hospital, Miami, Florida
1955. Jordan, Charlotte B., 519 Sarah St., Stroudsburg, Pa.
1955. Jordan, Claus G., 519 Sarah St., Stroudsburg, Pa.
1947. Kelchner, Clyde H., 1125 Turner St., Allentown, Pa.
1942. Kneedler, William H., 609 N. Statesville Rd., Davidson, N. C.
1944. LaMotte, William O., Medical Arts Building, Wilmington, Del.
1954. LaMotte, William O., Jr., 601 Delaware Ave., Wilmington, Del.
1952. Levan, John B., 401 Oley St., Reading, Pa.

*Military Service

1949. Lhamon, William T., Baylor University College of Medicine, Houston, Tex.
1954. Light, John J. B., 25 N. 9th St., Lebanon, Pa.
1948. Livingood, Clarence S., Henry Ford Hospital, Detroit 2, Mich.
1933. Long, Esmond R., Conifer, Pedlar Mills, Va.
1948. McCall, Milton L., Louisiana State Univ., New Orleans, La.
1937. McGuinness, Aims C., 1427 I St., N.W., Washington 5, D. C.
1948. McLaughlin, John T., 1252 S. Central Ave., Glendale, Calif.
1949. Manlove, Francis R., 6015 E. 17th Ave., Denver, Colo.
1953. Margolies, Michael, 567 E. Chestnut St., Coatesville, Pa.
1935. Mason, James B., 40 E. Erie St., Chicago 11, Ill.
1935. Matthews, Robert A., 1542 Tulane Ave., New Orleans, La.
1932. Meade, Richard H., Jr., 750 San Jose Dr., Grand Rapids, Mich.
1936. Middleton, William Shainline, Veterans' Administration, Washington, D. C.
1928. Moon, Virgil H., Univ. of Miami, Coral Gables, Fla.
1949. Motley, Hurley L., 1212 Shatto St., Los Angeles, Calif.
1950. Neefe, John R., 627 Eleventh St., St. Petersburg, Fla.
1937. Nicholson, Samuel T., 2d., 642 High St., Pottstown, Pa.
1941. Nisbet, Verner, 714 Queens Rd., Charlotte 7, N. C.
1905. Norris, George W., Dimock, Pa.
1926. Paul, John Rodman, Dept. Preventive Medicine, Yale University, New Haven, Conn.
1947. Pearce, Louise, Trevenna Farms, Belle Mead, N. J.
1922. Pleasants, Henry, West Chester, Pa.
1953. Raffensperger, Edward C., 2039 N. 2nd St., Harrisburg, Pa.
1938. Read, Hilton S., 5407 Atlantic Ave., Atlantic City, N. J.
1936. Reisinger, John A., 901 20th St., N.W., Washington, D. C.
1955. Rettew, Philip L., 612 Museum Rd., Reading, Pa.
1947. Rogers, Arthur Merriam, 1351 Durwood Drive, Charlotte, N. C.
1907. Royer, B. Franklin, 429 E. Baltimore St., Greencastle, Pa.
1953. Scanlan, Robert L., St. Vincent's Hospital, 2131 W. 3rd St., Los Angeles 57, Calif.
1945. Schell, James F., Veterans Hospital, Wilmington, Del.
1928. Schofield, Frederick S., Veteran's Admin. Hospital, Beckley, W. Va.
1913. de Schweinitz, George L., 203 E. Broad St., Bethlehem, Pa.
1941. Shands, Alfred R., Jr., Alfred I. duPont Institute, Rockland Rd., Wilmington, Del.
1908. Shannon, Charles E. G., 9 Park St., Waterville, Maine.
1943. Shewbrooks, Daniel N., The Acacia Mutual Life Ins. Co., Washington, D. C.
1950. Shiffer, Paul H., Dreher Ave., R.D. #2, Stroudsburg, Pa.
1951. Shorey, Winston K., Jackson Memorial Hospital, Miami, Fla.
1932. Siegel, Alvin Erdreich, Medical Arts Building, Macon, Ga.
1933. Smelzer, Donald C., Lancaster General Hospital, Lancaster, Pa.
1954. Smith, Charles W., 121 State St., Harrisburg, Pa.
1929. Sponsler, Marshall B., 103 Lansdowne Road, DeWitt, N. Y.
1934. Stewart, Sloan G., Pacific and North Carolina Avenues, Atlantic City, N. J.
1931. Stiles, Merritt H., 820 S. McClellan St., Spokane, Wash.
1953. Stroud, Morris W., 3rd, Harvard Rd., Cleveland, Ohio.
1942. Thompson, Wesley D., 18 N. Main St., Lewistown, Pa.
1941. Tompkins, Pendleton, 450 Sutter St., San Francisco, California.
1950. Ullery, John C., Ohio State University, Columbus, Ohio.
1913. Vail, William Penn, Blairstown, N. J.
1912. Vaux, Norris W., Chateau Crillon, Phila. 3.
1897. Veasey, Clarence A., 1118 W. 9th Ave., Spokane 9, Wash.
1931. Walker, Herschel Carey, 320 Park Ave., New York City, N. Y.
1914. Willard, De Forrest P., Sea Island, Ga.

1935. Willard, John H., Harlan Memorial Hospital, Harlan, Kentucky.
1952. Wood, Horatio C., III, 4309 Prospect Rd., Peoria, Ill.
1947. Zintel, Harold A., St. Luke's Hospital, Amsterdam Ave. & 113th St., New York 25, N. Y.

Honorary Fellows

Limited to Fifty, of Whom Twenty May Be Foreigners

American

ELECTED

1917. Miner, Charles Howard, B.S., M.D., Member of Board of Directors, Wilkes-Barre General Hospital; Board of Health, Wilkes-Barre; Board of Directors, White Haven Sanitarium Association and Penna. Tuberculosis Society. 264 S. Franklin St., Wilkes-Barre, Pa.
1936. Richards, Alfred Newton, PH.D., SC.D., M.D. (HON.), LL.D., Emeritus Professor of Pharmacology, School of Medicine, and Associate Trustee, University of Pa.
1942. Russell, Frederick Fuller, M.D., Brig. Gen. Med. Corps, U.S.A. (Ret.). 4938 Brownsboro Road, Louisville, Kentucky.
1947. Stone, Robert Spencer, Univ. of California Medical School, San Francisco, Calif.

Foreign

1937. Dale, Sir Henry Hallett, C.B.E., F.R.S., M.A., M.D., F.R.C.P., 24 Harley St., London, W. 1, England.
1922. McCarrison, Sir Robert, Kt., C.I.E., M.D., D.SC., LL.D., F.R.C.P., Major-General, Indian Medical Service (retired). 18 Linton Rd., Oxford, England.
1955. Mann, Ida, M.A., D.SC., M.B., B.S., L.R.C.P., D.O.M.S., F.R.C.S., Ophthalmic Consultant to the Government of W. Australia, 56 Hobbs St., Nedlands, Perth, W. Australia.

Honorary Associate Fellows

1955. Clement, Martin W., 1964 Suburban Station Bldg. (3)
1955. Diemand, John A., President, Insurance Co. of N. America, 1600 Arch St. (2)

Necrological List

Resident Fellows	*Date of Election*	*Date of Death*
Albert E. Bothe	May 7, 1928	November 11, 1955
Henry P. Brown, Jr.	October 1, 1919	February 19, 1955
Howard C. Carpenter	January 11, 1926	April 7, 1955
Sumner H. Cross	December 5, 1917	April 23, 1955
Howard Dehoney	June 4, 1902	July 4, 1955
David N. Husik	January 11, 1926	November 20, 1955
H. Wesley Jack	May 13, 1953	June 20, 1955
Edward J. Moore	May 2, 1951	September 28, 1955
Hubley R. Owen	October 6, 1915	October 8, 1955
Thomas A. Shallow	May 7, 1924	December 26, 1955
William B. Swartley	January 9, 1928	November 15, 1955
William S. Wadsworth	February 4, 1903	March 20, 1955
John K. Walker	November 7, 1906	June 18, 1955
Warren Walker	April 3, 1907	April 26, 1955
James W. Wister	June 1, 1904	November 13, 1955
Joseph C. Yaskin	May 10, 1937	August 10, 1955

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